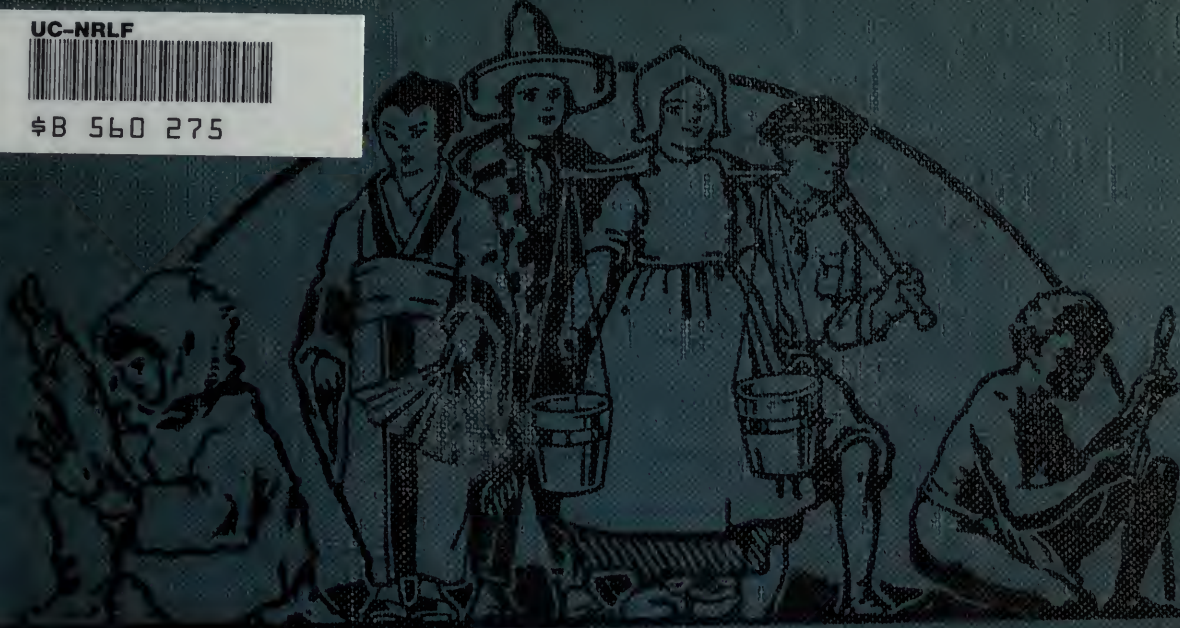


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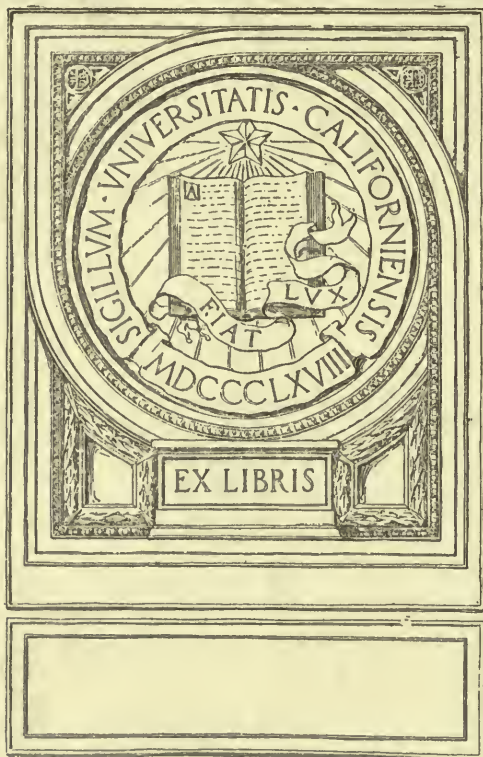
HUMAN GEOGRAPHY

J. RUSSELL SMITH

BOOK TWO
REGIONS AND TRADE

GIFT OF

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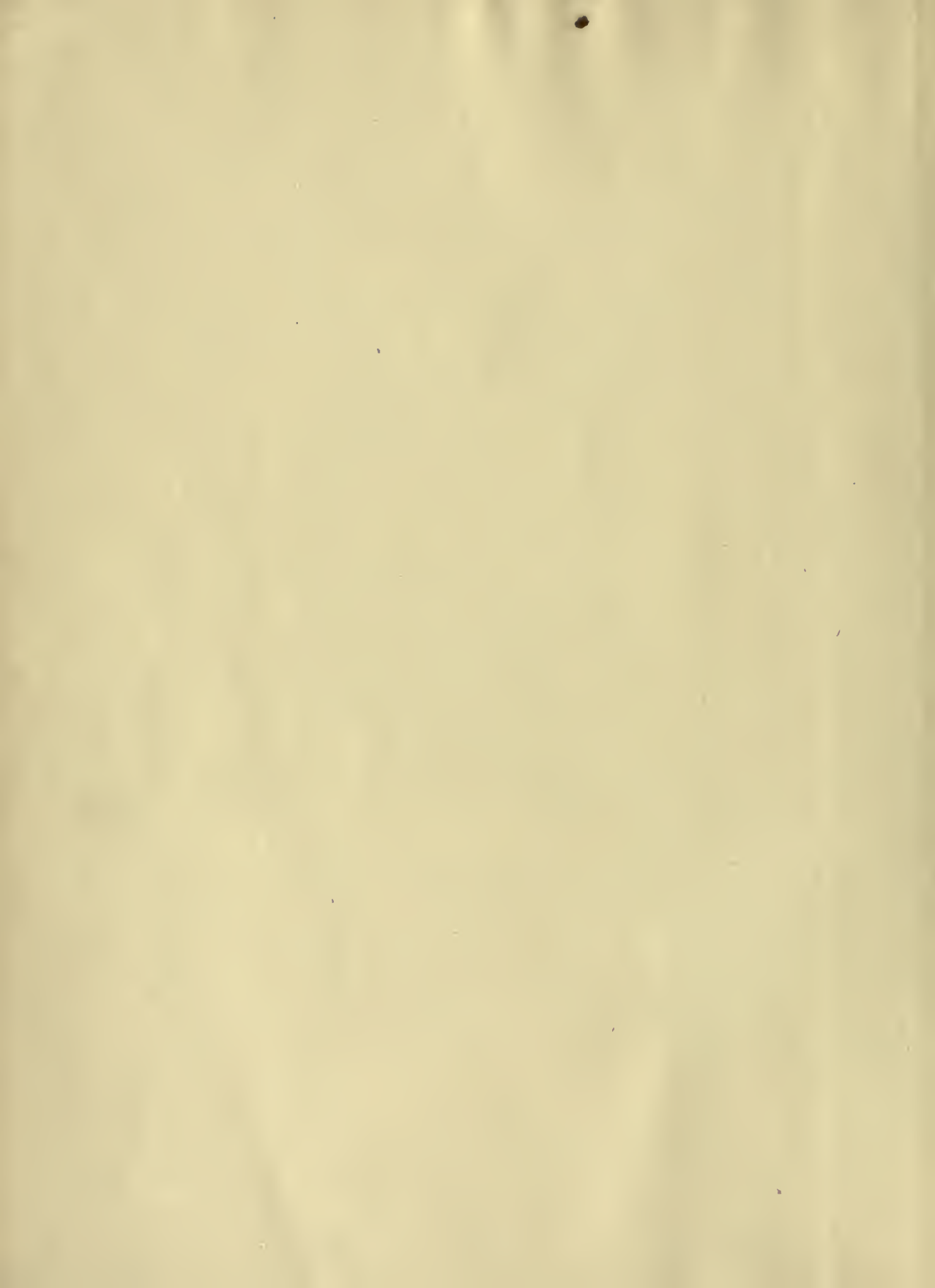




Fig. 1. A scene in which elevation divides the land into zones. In the first valley, alfalfa, beets, barley, and wheat are grown. On the slopes above the valley floor and below the upper irrigation ditch, there are groves of almond and walnut trees, and orchards of peaches, apricots, oranges, and lemons. Many of the orchards are in blossom. Above the irrigation ditch, cattle and sheep pasture on the lower slopes and in the open forests. On the higher slopes are snowfields that furnish water for power and irrigation. The electric transmission line carries power to the distant city. Where might such a scene as this occur? What can you tell about the climate in such a region? How many kinds of food production are shown in this picture?

HUMAN GEOGRAPHY

BY

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PROFESSOR OF ECONOMIC GEOGRAPHY, COLUMBIA UNIVERSITY

AUTHOR OF

*Industrial and Commercial Geography, Commerce and Industry,
The World's Food Resources*

BOOK TWO REGIONS AND TRADE



THE JOHN C. WINSTON COMPANY

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TORONTO, CAN.



This book is on a new plan. Indeed, it is so new that I have not dared to publish it without first having the *plan* approved by many teachers and then having the *lessons* tried out in *actual classes*. I have thus received much advice from experienced teachers who have taught parts of this book in the sixth, seventh, and eighth grades. Their assurance that the plan of the book works well in class and that the lessons are easily teachable has been a satisfaction and a stimulus in the completion of this book.

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HENRIETTA STEWART SMITH, my wife, skilled in juvenile psychology, who has helped me with three or more revisions of each of the eighty-two chapters of this book.

J. RUSSELL SMITH,

Columbia University, New York City.

Jan. 14, 1922.



Geography has long been regarded as the natural center around which the curriculum develops. How should this central subject be presented?

I. There should be an introductory framework of observational and place geography.

II. Then Regional-Human Geography should follow. Regional Geography is the study of the world by divisions that have unity with regard to the conditions affecting human life. For a number of years, progressive teachers have insisted that the regional method should be used in teaching geography in the elementary schools of the United States. The regional method has been discussed at educational meetings and by educational journals, and there have been attempts to apply it in prescribed or proposed courses of study. It is already being used successfully in many of the higher schools of the United States, despite the scarcity of suitable texts. A recent canvass of teachers revealed the strong sentiment in favor of it.

"Should Book Two of the Human Geography Series be based on political units, or on natural (economic) regions?" I put that question to a group of expert teachers of geography in elementary schools, and in a normal school in a large city. Every teacher in the group voted by secret written ballot for the regional, instead of the political unit. Why teach Regional Geography in the grades?

A. *Regional Geography is an addition to geographic knowledge.*—First, we must teach children about their home, which is in a rural or in an urban locality. It is also in a county, a state, a country. Yet more, it is in a *natural region*. This last is the new element and a little thought will show that the *natural region* in which a modern man lives is the fact that often decides his occupation, and perhaps his future prosperity.

Most of the American geographers were trained first in geology, then they specialized in physiography, which is the minute study of just how the forces of nature shaped every mountain, hill, valley, and sandspit of the earth's crust. Overlooking human use, men with such training sometimes tell us that the units of study in regional geography should be physiographic regions; a coastal plain, for example, should be a region even if one end is swamp and the other end is desert.

This book is *Regional-Human Geography*. The center of classification is *man*, not physiography or any of the other elements. The

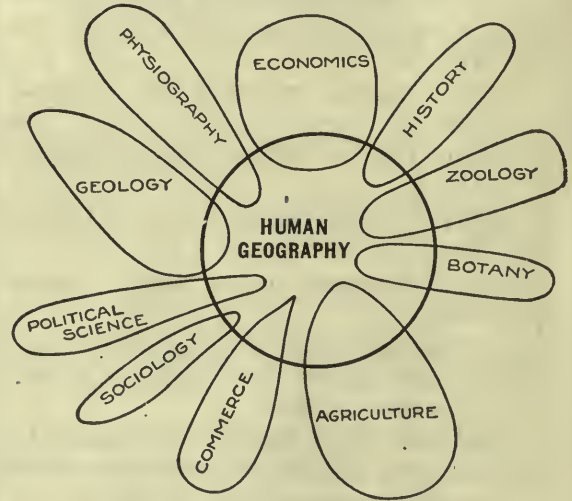


diagram shows the relationship of sciences to Human Geography. People are the most interesting and important things in the world. This book, more than any other geographic text, tells of human action, of the world as the home of man. It contains physiography, economics, history, and other sciences, but it presents them always as they affect *man*, and help him to live in his *region*.

B. *Political Regions are arbitrary and accidental; Natural Regions are scientific:*—Wars, elections, acts of legislature, or even the whims of one man at a desk may change the political map any day. Take the South Atlantic group of states. What states are in the group? Do Delaware and Maryland belong? Yes, they do, *now*. Recently they have been moved in from the Middle Atlantic States. It happened that a statistical gentleman in the Bureau of the Census at Washington wrote the words "Delaware" and "Maryland" in another column because that happened to be statistically convenient. You will hunt long before you will find anything that these states grouped thus arbitrarily *have in common* and that *other states* do not share. When you are interested in the *life* of man on the earth there is no reason for studying these particular states as a *group*.

What can be said of the South Atlantic



States as a whole, as they are now grouped by the census man? A part of their area is beautiful mountains; another part rolling piedmont; another part a rich coastal plain. Because of the circumstances of soil, surface, and climate, the people living in the mountains think in terms of mountain farms, of coal, of lumber, and of the tourists who visit the refreshing uplands. The people of the warmer sections grow cotton, buy cotton, sell cotton, think in terms of cotton. Indeed, most of their prosperity depends upon cotton. In speaking of this group of states, or even of one state, we instinctively talk about one of these parts or natural regions at a time. *We instinctively* use the regional method. Regional geography treats of these natural regions,—mountains, the piedmont, the cotton belt, each as a geographic unit—a region—a human-use region.

C. Regional Geography is the scientific method.—Science classifies knowledge by putting together things that are alike. If we were thinking primarily of government when we study geography, then a county, or a state, or a group of states would be a good unit. But we are thinking primarily about the earth as the home of man, and for that purpose the political unit is the wrong classification. Man living on the earth lives in relation to a corn belt, a wheat region, a trade or manufacturing region; to semi-arid pastures, or to some other natural region. Hence classification of regions by human use is the scientific method for the study of geography for the children of America.

D. Regional Geography is the method of business thinking.—Practical men think in terms of Regional Geography. They do so because they must. For years business men and economic writers have been talking about the "Cotton Belt," the "Corn Belt," the "Wheat Region," and about other producing regions of the world. Why is this? It is because men, thinking of business, must think in terms of regions of production. To use states alone (political geography) confuses economic understanding, because most states are parts of several natural regions.

E. Regional-Human Geography helps economic understanding.—Men are learning more and more that business, politics, national policy, even peace and war, are largely matters of economics, and that economics rests

in large part on a geographic basis. When we understand why one part of our country is corn land, worth over \$200 an acre, and why another part is ranch land, worth less than \$20 an acre, and why one region forges ahead in manufacturing and another manufactures but little, then we have made a great stride in economic understanding. The modern trading man (all of us are trading men) needs more and more to know *why* certain regions are cotton, lumber, or factory regions, and why his own region may or may not be expected to have trade with certain other regions. Geography, studied by Human Use Regions, can emphasize these things.

F. Regional Geography saves time.—Consider one region, the land of light rain and wide ranches east of the Rocky Mountains, where pasture is the chief resource of man. These pasture plains extend from Mexico northward across the Rio Grande through state after state until finally they include a part of Canada. When we have described this vast region of ranches we have at the same time described parts of many states and of three countries. It would be foolish to repeat the description of these plains for each separate state, group of states, or country when the entire region can be treated as a geographic whole.

G. Regional-Human Geography uses comparison.—One of the early astronomers is said to have claimed the discovery of an elephant on the moon—but a friend reached up and took a fly out of his primitive telescope. The ancient astronomer had nothing with which to compare his discovery. It is too often thus with the knowledge children get of foreign countries. We learn by comparing the unknown with the known. Comparison aids memory and understanding. Regional Geography makes comparison easy. When we have fully explained the California climate and its resulting fruit industries, the child can easily understand each of the four other similar regions in five other continents.

Regional-Human Geography gives the child a wonderful set of standards for comparison.

III. The Applied Science method.—The systematic science method used in the old geographies begins by teaching about weather, climate, streams, trade, industries, and the other big abstract ideas. After the child has acquired all of these abstract principles, he is then supposed to be able to apply



them to the study of geography and to the various countries of the world. This German *systematic science* method has bored tens of thousands of children, and has given thousands of teachers a headache.

The new pedagogy uses the *applied science* method, the method by which children *naturally* learn. This method gives the facts first and lets the ideas develop from the facts. The great teachers of all ages have used this method. Æsop used it in telling his fables. By the method of telling *fact before ideas* we can *teach more ideas* than could possibly be taught by the older method which was devised by adults for adults.

This book presents scientific facts at places *where they do something*; where they function as natural parts of an explanation. By the use of the applied science and explanation method the child more easily remembers both the *science* and the *thing explained*, whether a part of the earth's surface or of man's work is considered.

IV. *Explanation helps memory.*—In the past, geography has too often been taught as mere unexplained memory work. The regional method is a great aid to memory because it puts reason back of the scraps of Political Geography and makes unities of them. It is easy to remember things that we understand.

V. *Fundamental civics.*—The child who masters this text has opportunity to absorb the two greatest civic concepts that his generation can have: (a) a sense of the obligation of individuals to larger groups, and (b) a sense of the interdependence of men and of nations.

VI. *The link between geography and history.*—This book contains many vital bits of history because a knowledge of historic events is necessary to a complete understanding of human geography. It is equally true also that history is only a jumble of facts unless the student has acquired the necessary background of Regional Geography. Human Geography knits Regional Geography and History together, and helps the pupil better to understand both subjects.

VII. *Pictures that teach.*—Pictures should be to the text what jewels are to the setting. Teachers will find unusual teaching value in the pictures in this book. To attain this end we have often rejected hundreds of pictures to one which has been accepted.

VIII. *The Regional-Human method makes Political Geography alive and full of meaning.*—Political Geography is not sacrificed because emphasis is laid upon natural regions. Indeed, it is necessary to teach the old style Political Geography when we are teaching Regional Geography. For instance, to locate the Cotton Belt we must show that it is in *such and such states*. The regional maps are political maps too. The book contains in addition a full set of new political maps of the best type.

Regional-Human Geography takes a great forward stride in interpreting Political Geography. It puts meaning into a new Political Geography because it shows the influence of different types of governments upon the lives of peoples. The Human Geography treatment of the efficient democracy of Denmark, the strong central government of Japan, the weakness and disturbance in China and Mexico, and the chaos of African tribes, emphasizes the relation between government and the welfare of peoples.

IX. *Maps that are simple.*—Since a map carries more information than any other page of print yet invented, the map-maker is tempted to overload. When the child studies an overloaded map, his mind cannot easily grasp the specific data required because there is *so much else* to see. Hence he is confused. By having each map show a few things, our maps are made to meet the new pedagogical demand for simplicity.

X. *The future.*—This book discusses the undeveloped resources of regions in such a way that future possibilities of each part of the world are glimpsed. Our idea of the further development of our home region and of other regions will often greatly influence our actions. A study of the future broadens one's economic understanding.

XI. *A Manual for the teacher.*—To teachers using this text, the publishers, upon request, will send free, a Manual which contains new teaching helps, additional problems and questions, definite references to supplementary reading, and other material that will help the teacher make geography a living subject, one that holds the children as a game holds them. Every teacher should write for one to

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Fig. 2. Buildings, field, and fat cattle on an Indiana farm. Which is easier to plow, this field or the one shown in Fig. 4? What do you see in the picture which indicates the kind of climate and the kind of surface?

INTRODUCTION

THE SIX NEEDS OF ALL MANKIND

1. **Something in which all races are alike.**—People differ from each other in race, in color, and in the kinds of places in which they live. Yet all mankind is alike in having six needs. Every man in the world needs (1) food, (2) fuel with which to cook the food, (3) a house or some other form of shelter, (4) clothes to wear, (5) tools to help him make and carry goods, and (6) luxuries or ornaments to please his sense of beauty and his love of ornament, of power, or of play. Name two of each class.

In having these six needs all men are brothers. No matter of what color or race a man may be, he struggles to get these needed things. The things themselves are very different among different peoples, but every people has some of all six kinds. The Eskimo needs more clothes than does the black man in the hot forest near the equator. The black man

does not need a warm house, but he needs a leaf shelter to keep off the sun and the rain. Every race makes tools for the work that has to be done, and every tribe and people has its sports, games, and playthings.

2. **Different ways of meeting the needs.**—Men in different places get the six kinds of needful things in many, many different ways. The world has so many kinds of land and so many kinds of climate, that men have found various materials to use. Since men have learned how to build railroads and steamships and automobiles, they can travel easily and can get the needed materials from widely separated parts of the earth. It has been only a few decades that it has been possible to go to the stores and buy so many kinds of things. Not long ago the people of each neighborhood had to make nearly all of the things they used. There are still a few places like that.



Courtesy Olive D. Campbell

Fig. 3. Spinning threads into yarn at the cabin door. When did your ancestors spin that way?



Fig. 4. Plowing a hillside field to plant corn in the Mountains. Would a tractor (Fig. 17) be of much use on such land? What will a hard rain do to this field? (Fig. 82.)

Courtesy Olive D. Campbell

3. Life far back in the mountains.—When the author of this book was a college student he visited such a home in the heart of the Appalachian Mountains. From the railroad station he had to ride for a whole day on horseback along a narrow path that followed a creek. Sometimes, because high hills rose on each side, the valley was so narrow and steep that the horse had to walk in the creek. There was no level land on the hilltops, and very little in the valleys. Once in a while a valley would widen out enough to make room for a little field near a cabin.

At evening the traveler reached the home where Dave Douglas lived with his wife and five children. Dave had cut trees from the forest to make the small, one-roomed cabin which sheltered the family. Behind the house were his garden, his small field of corn, and his many acres of forest. The floor and the door of the cabin were made of boards hewn out of logs. Even the latch on the door was made of wood. The window was just a hole cut in the side of the wall. Dave had no glass to put in it; instead he used a piece of board, which could be pushed over the hole when it rained or the wind blew cold. There was no stove; only a hearth on which an open fire could be made. In the fireplace hung an iron pot in which food might be boiled. For frying, there were two skillets which hung on pegs

beside the fire. The plates used by the family were wooden and homemade. The only things that had been bought were axes, a gun, powder and shot, steel traps, three hoes, a spinning wheel, knives and forks, pot and skillets, a tin bucket, a dishpan, salt, blue overalls and jackets for the men, cotton dresses for the women, needles and thread, and fishhooks.

4. Home-raised food.—

For breakfast the family ate corn cakes and salt pork, and sometimes eggs. They fried the pork in a skillet over the open fire. They mixed cornmeal with water in the dishpan, and then baked it in the other skillet. Their dinner was like their breakfast, except that they added boiled potatoes and cabbage, and some blackberries which they had picked from bushes at the edge of the woods. Supper was the same as breakfast, unless one of the older children was lucky enough to shoot some squirrels in the woods, in which case the whole family had fried squirrel. Alf, Dave's fifteen-year-old boy, carefully skinned all the squirrels that were brought home, because tanned squirrel skins made good shoestrings and harness thongs.

Dave owned two dogs, a cow, two oxen, twelve pigs, some sheep, and some chickens. They used corn to make bread for themselves, and to feed the cattle and the sheep when the snow covered the ground, and the animals themselves could get no food. The pigs roamed the woods, and got their own living by eating acorns and hickory nuts, and by digging up roots with their stout noses. An ox pulled the wooden plow that was used in the cornfield. He also pulled the narrow wooden sled that served for a wagon on which the family hauled corn and wood. In the autumn, Dave and Alf drove one ox away down the valley path, many miles, until they finally came to the railroad.

Here they sold the ox to a cattle dealer. They could spare the ox, because his younger brother would be big enough to take his place at plowing the next spring.

5. Homemade clothes.—

As they trudged back up the mountain path to their home, Dave and Alf carried many small things bought with the money received for the ox. But they did not have enough money to pay for warm woolen clothes for winter.

Dave's wife, Sallie, had to make these with the help of Mary, the oldest daughter. When the women had done the cooking and cleaning and had worked the garden, they always had spinning to do. After they had made the wool of the sheep into yarn on the spinning wheel, they knitted socks by hand. Sometimes they wove the yarn into warm cloth on the handloom. At other times they made caps of raccoon and squirrel skins, for they needed skin caps to keep all the Douglas heads warm in the frosty winter: The father made the shoes from a cowskin, to secure which he had traded four lambs to one of his neighbors. Thus did these people provide themselves with food, fuel, clothes, tools, and transportation. In the whole year the only things this family had to sell were the ox and the skins of some skunks and foxes. They could not even sell the wood on their lands, because they lived so far from a railroad that they could not have earned ten cents a day if they hauled wood down to the train. Since they had so little to sell, they could not buy much.

6. When every neighborhood supplied its own needs.—Some people in every continent are still living as the Douglas family lived. They can be found in out-of-the-way places even in Europe. Indeed, that is how most of the people in all the world have had to get along most of the time since men lived



Courtesy "The Country Gentleman"

Fig. 5. Preparing a level field for the spring planting. Can a man produce more corn in a season in this field or in the field in Fig. 4? Why?

in caves. At one time nearly all the families in the United States supplied their own needs. Now most of us live differently, because every family has many helpers.

7. Who are our helpers?—Isn't it fair to say that the people who make things for us are our helpers? They help us by making things we use, and we help them by sending other things in return. The trade that now is possible by ship and train makes distant men our helpers. Let us see who are some of the helpers of the children who come to this school. What do the people in this neighborhood eat for breakfast? Where is the food made? Let us see how many different states and countries and kinds of people are neighbors and helpers to us by helping with our food, our fuel, our clothes, and our houses. Write on the blackboard a list of the articles that we use, the states and countries from which they come, and the kinds of people that help by making them. Make another list which will show the things that are sent from the neighborhood of this school in return for the many things we receive here.

QUESTIONS

1. How did Dave Douglas provide his family with food, fuel and shelter?
2. Suggest from Figure 3 the method used by Sally and Mary Douglas in making clothing for the family.
3. Would you rather live in your home or as the Douglas family lived? Why?
4. What are raw materials? Prepare a list showing

the raw materials from which your six needs are supplied. Arrange your list as follows:

RAW MATERIALS USED IN SUPPLYING ME WITH

FOOD.	FUEL.	SHELTER.	CLOTHING.	TOOLS.	LUXURIES.
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5. How did the early Puritans supply their needs? 6. How does the Indian of the Great North Woods provide himself with the necessities of life? the Eskimo? the black man of the tropics? 7. Name some things which you think Mary and Alf Douglas may have known how to do better than you; that you know how to do better than they. 8. Tell a story in which you imagine that all means of transportation and communication have been shut off between your neighborhood and the rest of the world. Tell of the difficulties which might arise, and how you would meet them.

9. Name and point out on the map the countries of all the people who have helped your school by making something someone in it has used.

10. Study closely Figs. 2, 4. How many points of advantage can you find in favor of the level farm? If you were in the real estate business and were trying to sell the level farm, to what in the picture would you call the attention of prospective purchasers? What does the level land farmer sell?



Fig. 6. Mountaineers' cabins in the Appalachians in the old days. Do you think the man with the mule was more prosperous than Dave Douglas? Why do you think so?

make candles; the boy Lincoln read his few books by firelight. The few things they got by trade came in wagons over the Allegheny Mountains to Pittsburgh, and down the Ohio in flatboats.

9. Lincoln's trip to New Orleans.—When Lincoln's neighbors wanted to sell wheat and salt pork, they joined together and built a flatboat, which they floated down the Ohio and Mississippi with a load of produce. On such a trip to New Orleans Lincoln went when he was nineteen. Down, down the ever-winding river, day after day, past hundreds and hundreds of miles of dark forest, drifted the boat. At last, after many days, they saw on the left bank of the muddy,

winding river a little, straggling city, called New Orleans. Sailing vessels that carried wheat and meat to the West Indies and to Europe were tied to the river bank. After the men had sold their wheat and pork, they sold the boat as lumber, for the Mississippi was

so swift and deep that they could not push the flatboat, even when it was empty, upstream with poles. The men went home by steamboat. Before 1810 men had to walk all the way home through the great forests.

Now you begin to see why there was not much trade in the region where Lincoln spent his boyhood. At that time, most of the people of America lived in the country, where each family grew its food, made most of its own clothing, and chopped its own firewood. But now many distant parts of the world help to provide us with food, clothing, shelter, and tools. What made this sudden change, which so quickly built up a world-wide trade and made all people neighbors?

OUR NEW WORLD

8. Before we had railroads.—It is only since engines, steamships, and railroads have been invented that so many people in so many countries have been able to help us live comfortably in our neighborhood. Railroads are quite new in the history of the world, and they bring many of the things that make us comfortable. Even Abraham Lincoln, born in Kentucky in 1809, had a home almost exactly like the Douglas home (Sec. 3), and it was as good as any in the neighborhood. His family did not have a stove, nor did they have enough tallow to

10. The great inventions.—This change was largely due to a series of great inventions. Abraham Lincoln was only nineteen years old when the first railroad in the United States was built, in 1828. The first telegraph line was used in 1844, and the first steamship line to Europe was started in 1836. About this period the reaper and many other new machines were invented. From that day to this, men have been inventing new machines faster and faster. The steam thresher, the tractor, the gas engine, the telephone, the ocean cable, the electric motor, the typewriter, the fast printing press, and many other machines help men to do things much more rapidly and easily than before. In Lincoln's boyhood men used muscle, as they had done for ages; now they use machines. In those early days men drove horses; now they drive engines.

Any traveler can now go from Maine to California in less than the seven days which it took George Washington to bump along in his horse-drawn coach for 225 miles over a rutty road, from Washington to New York. Now, instead of spending weeks walking through the woods from New Orleans to Kentucky, as was necessary when Lincoln was born, the traveler can take an afternoon train at New Orleans, rest through the night in a sleeping car, and arrive in Kentucky the next day.

11. Sea trade and travel.—On the sea, likewise, inventions have made travel safe and speedy. After ships were driven by steam, it was easy for the naval vessels to catch the ships of the pirates who were such a danger to travelers in George Washington's

time. The sea is made safe not only by the naval vessels, but by many light-houses, and by wireless telegraph, which enables men to speak from



Photo. International Film Service, N. Y.

Fig. 8. A model of the *Mayflower*, the good ship which carried the Pilgrims safely to Plymouth in 1620. Would you like to cross the ocean in such a boat?

ship to ship and to call for help from hundreds of miles away, if they are in distress. To-day, steamships leave New York and San Francisco for Europe, Asia, Africa, Australia, and South America. Steamships sail the sea as regularly as the mail comes to our doors. These ships, and the trains, too, bring us many, many things from all over the world.

12. News.—Every morning the newspaper can tell about events that happened the day before in every one of fifty countries. This is due to the ocean cable and to the wireless telegraph, which enable men to exchange ideas in a few hours with others who are thousands of miles distant.

13. Coal, iron, and oil have made a new world.—This new world of transport, trade, easy travel, and long-distance messages has come because we have made coal, oil, and water power work our iron machines for us. Coal helps by driving engines that run factory machines, locomotives, and steamships. Petroleum helps by running automobiles, ships, trucks, and airplanes. Iron helps when made into engines, railroad rails, machines, freight cars, and steamships. Electricity helps by making rapid communication possible for us—on the land by telegraph and telephones, under the sea by cables, and through the air by wireless.

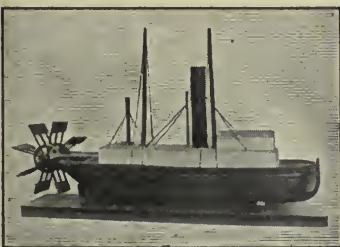
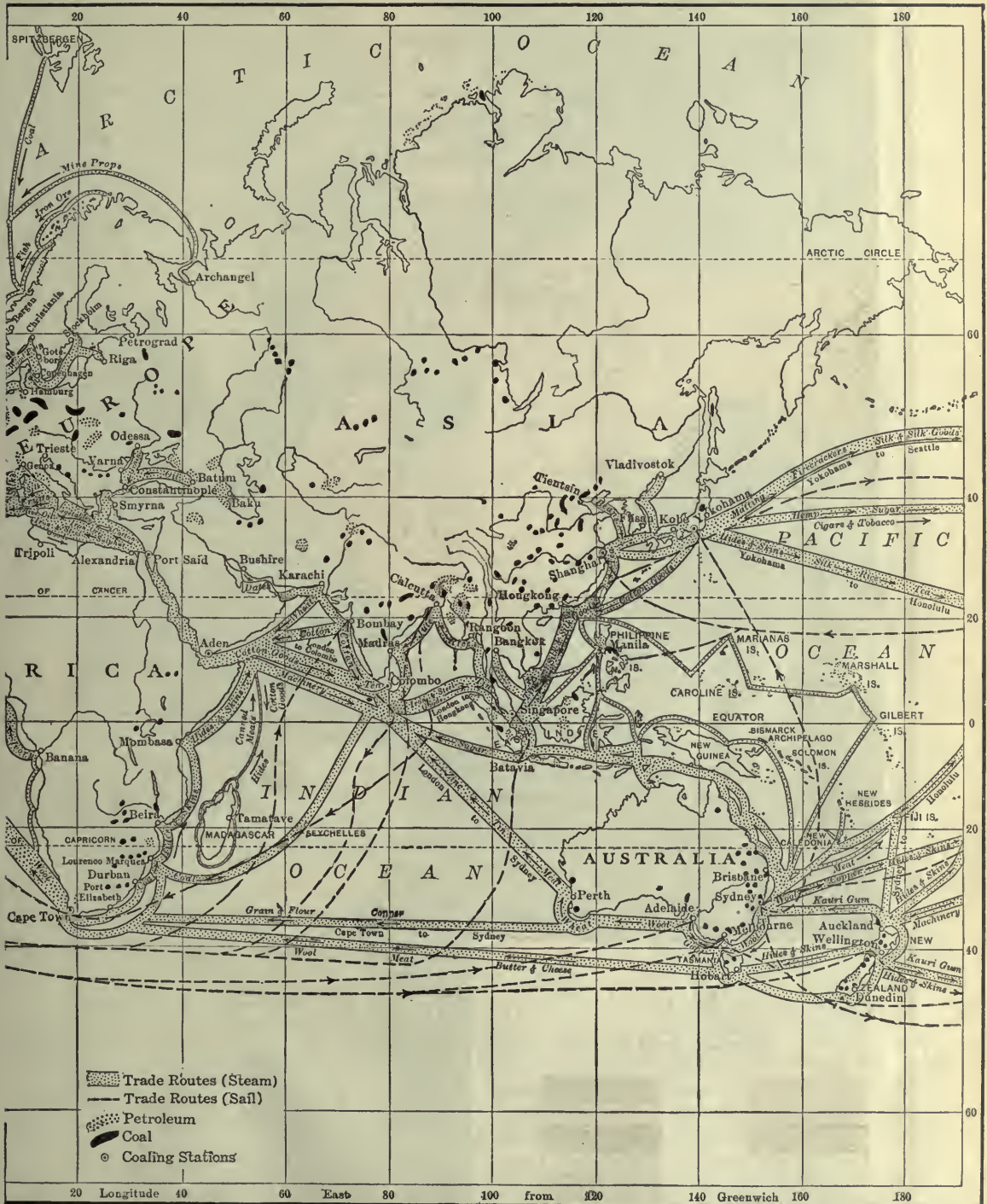


Photo. International Film Service, N. Y.

Fig. 7. A model of the first steamboat that went up the Mississippi River. This was in 1810.



the value of the trade on each route. The names of leading articles are printed on the routes, and arrows show the where your ship would get coal. How long would the journey be? (See Appendix.)



Fig. 10



Fig. 10



Fig. 11. The stagecoach was the fastest means of travel, except by horseback, in the days when George Washington was President.

Every day hundreds of thousands of men are down in mines, digging out coal to keep this world trade going. Miles and miles of freight cars loaded with coal travel on the railroads. On the ocean, at all times, hundreds of steamers carry coal to places which have no coal of their own. The coaling-station map (Fig. 9) shows the routes by which vessels cross the oceans of the world, and the ports where coal is waiting for them. We can now talk to all the world by cable and wireless so quickly that we can know much more of Europe in a day than Washington could learn in a month.

14. The division of labor.—Nowadays most people, instead of having many jobs, as Dave Douglas had, have but one job, and live by trade. This arrangement we call division of labor. It is easier for a tailor to make two coats, and a shoemaker to make two pairs of shoes, and then for each to exchange his goods with the other, than it is for each man to make for himself one pair of shoes and one coat. For this reason, men have divided their labor, so that one man may do a certain kind of work and

another man may do another kind. In a similar way, trade enables us to make a division of labor among the different parts of the world, each part producing those things that it can best produce, and exchanging its surplus for the products which some other region can best produce. Since the railroads and steamships have made it easy to trade, people have been able to live comfortably in any region where they can have even so little as one industry. They export the surplus product, and buy what they need from many other regions. It is trade that

has helped the white man to spread over most of North America so quickly since 1810.

The world is one. Trade has made it so. The different parts of the world are now connected. No longer do most of the families of the world live apart from other families, as the Douglas family did; or as the people of Lincoln's neighborhood did. Ships, railroads, telegraphs, and machines have made the people of many lands our helpers. Each country now has something that we buy. Trade has also made us helpers to many other people. We help them by selling to them the things that they want. And thus it is with nearly all peoples in those parts of the world where travel has been made easy.



Fig. 12. The first steam railroad train in New York State, less than one hundred years ago. Contrast this picture with Fig. 122.

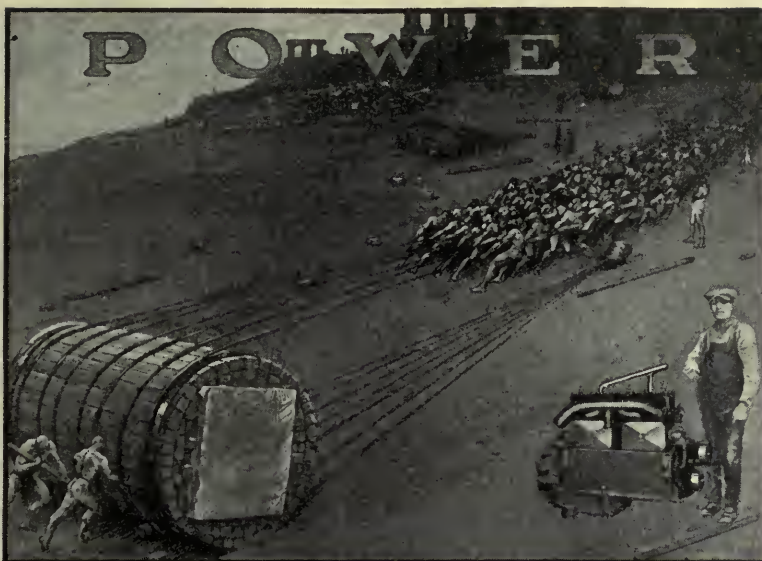
Courtesy of the N. Y. C. and H. R. R. R.

QUESTIONS

1. List ten articles of food in your home or in the grocery store. Where was each article of food produced? Describe the journey on its way to your home. (Figs. 9, 10.) 2. Name some products which your community produces to sell to the people from whom your food products come. 3. Why is it proper to call these people your neighbors? 4. Might the boy Lincoln have found ten such articles in his home or neighborhood? Give two good reasons for your answer. 5. Go with Abraham Lincoln on his boat trip, and report the story for your school paper. 6. Name as many great inventions as you can, and tell how each has helped to make the people of our new world neighbors. Why is 1810 an important date? (Fig. 7.) 7. Imagine that coal and iron had never been discovered, and tell how the life in your community would differ from what it is to-day. 8. Select three different routes by which one could travel from Boston to San Francisco by rail. (Fig. 309.) Write an account of a journey by one of these routes. 9. Describe a trip across the continent which would make use of as many as possible of the waterways of the continent, and at the same time be nearly direct. 10. What barrier prevented the people of Europe from settling North America earlier? What discoveries led to the overcoming of this barrier? 11. For more than two centuries after the English settled at Jamestown, Virginia, vast areas west of the Allegheny Highland were practically uninhabited by white men. Why? 12. Did the first white settlers of the country beyond the Alleghenies live as Dave Douglas lives or as we live?

STUDYING THE WORLD BY REGIONS

15. Ways of studying geography.—How shall we study about this world in which all people are neighbors to one another? One way to study it is to learn about one state after another, and one country after another. This is not the best way to study geography, because many little states or countries are



Courtesy Continental Motors Co.

Fig. 13. The little automobile motor in the lower right-hand corner, with one man to feed it gasoline and oil, can do more work with a few gallons of gasoline than all these men working as the ancients did. Can you tell what the men shown in this drawing are doing?

like the neighboring states or countries. If several states are alike in surface, soil, and climate, we may as well study them all together.

For example, look at the State of Maryland, Figs. 15, 21, and 241. It reaches from the sandy seashore on the east to the Appalachian

plateau on the west. Between seashore and plateau are three different kinds of country:

1. A wide belt of low plain near the sea. 2. A belt of hills near the mountains. 3. A belt with many mountain ranges. On Fig. 21, notice that each of these belts or sections crosses the boundaries of Maryland into the states to the north and to the south. These natural regions have their boundaries determined by climate, soil, and surface and not at all by political lines or boundaries. The eastern ends of Maryland and Virginia, most of Delaware, and southeastern New Jersey, are all parts of the same long plain.

16. Natural regions.—After all, it is not the name of the state but the kind of region that decides how men make their living, what they have to sell to us, and what we can sell to them. It makes no difference whether a sandy plain is in Maryland or in Delaware. It is dotted with truck farms in both of these states, as well as in other states which lie in the plain. The State of Maryland happens to contain four different natural regions that extend into other states.

The best and easiest way to understand Maryland is first to study each of the

THIS MAP IS FOR REFERENCE ONLY.

For studying the regions of the United States, see the three double-page maps on pages 18, 56, and 124. This map merely shows the location of all the regions of North America with relation to each other.



natural regions of which it contains a part. That is the way by which, in this book, we shall study the world. We shall divide the world into natural regions. Each one of these regions includes all of the same kind of country in one part of the world. Since the people in a natural region all make their living in nearly the same way, we may call it an economic region. There people sell the same things, buy the same things, and do the same things, and it is easy for us to study about them all at one time, even if they do happen to live in different states or even in different countries. The heavy lines on regional maps (Figs. 14, 21) show the boundaries of various natural regions. You see that one of the regions of Maryland

goes far away to the south, another far away to the north. (Fig. 21.) The political boundaries on these regional maps make it easy to study political geography with regional geography.

QUESTIONS

1. Locate the state in which you live, either on Fig. 21 or 91, or 210. In what region or regions does it lie? 2. In what region is your home? 3. What other states are wholly or partly in the same region as your home? (*Note to Teacher: See Manual before doing Questions 4 and 5.*)

4. As you study North America, think about the desirability of each region as a place in which to live.

5. Fill out the following chart for the continent of North America, adding to it from week to week:

REGION.	STATES, PROVINCES OR COUNTRIES PARTLY OR WHOLLY IN REGION.	CHIEF CITIES IN REGION.



Fig. 15. Photograph of a relief model of a part of the United States. Can you see the low level plain east of Baltimore; and the high plateau west of Cumberland; the mountain ridges and the old roads of the wagon emigrants?



Fig. 16.



Photo. Louis R. Bostwick, Omaha, Neb.

Fig. 17. A "Prairie Dog" plow and a "Caterpillar" tractor in Nebraska. Compare with Fig. 4. Can you tell why some eastern farms have been abandoned?

THE SOUTHERN AND CENTRAL PLAINS

17. A group of nearly level regions.—In studying the world we should begin with our own continent, North America. The Table of Contents shows that all of North America may be divided into eight different groups of regions, just as some political maps show that the United States is divided into seven groups of states, such as the New England States (Fig. 216), and the South Atlantic States. (Fig. 26.)

A good place to begin our study of North America is with the southern and central plains, because this area is one of the easiest to understand. From the Table of Contents, in the front of this book, get the names, and on Figure 14 point out these regions. It is a wide area of low plains, or nearly level land. It occupies the southern and central part of the United States and Southern Canada. On the north it reaches the Indian country in the Great North Woods. Southward it reaches to the Gulf of Mexico, and south-eastward to the Atlantic. In all of this large central territory the only uplands are the

Ozark Plateau and the Ouachita Ridge (Fig. 21).

In so large a territory there are several natural regions. Let us begin with a small one, the Florida Peninsula.

THE FLORIDA PENINSULA

18. How Florida appears.—If you should ride through Florida by train or automobile, you would see many lakes and many swamps, with cypress trees standing in them (Fig. 22), and big oak trees with silvery moss hanging from the branches. You would also see miles of sandy soil, and miles and miles of pine forests. In a settlement here and there, dozens or hundreds of farmers would be busy with their orchards of orange and grapefruit trees (Fig. 25), their fields of celery (Fig. 23), beans, tomatoes, and other early vegetables, and their fields of corn.

19. Climate.—Florida is so far south that the climate is warm, even in winter. The people rarely heat their houses. In the southern part there are some winters when no frost comes. In the central part of the state



Fig. 18. The Florida Peninsula Region.



Fig. 19. A little pond or lake in a limestone sink. Florida has thousands of limestone sinks. Many of them are dry.

there are sometimes two or three frosts in winter, but they are often weeks apart, and the whole country is as green in January as the northern states are in July. The palm trees (Fig. 20) make parts of Florida look like South America and Cuba. Big black alligators sun themselves beside the rivers.

20. Warm waters.—There is an ocean current which flows into the Gulf of Mexico from the Caribbean Sea, on out through the Florida Strait, and then northerly between Florida and the Bahama Islands (Fig. 327). Why does Florida have a warm, moist climate? Which of the four winds can be cool and dry in Florida?

Florida has so much rain in the autumn that it beats the cotton off of the cotton plant. For this reason cotton is not grown in the peninsula, and the region cannot be included in the Cotton Belt.

21. How Florida was made.—The Florida Peninsula is one of the flattest parts of the United States. How long is it? (Fig. 26.) How wide? It is really a long, flat sand-bank, rising from the sea a foot or two to the mile. Not long ago, as time goes with nature, Florida was sea bottom. That is why so much of the soil is sand. While Florida was still under the sea, little animals called corals lived on it. Their skeletons made much of the limestone that is now to be found there. Many layers of seashells were left there by the shellfish that live on the sea bottom. These shells are now layers of soft limestone near the surface of the sand. Most limestone is made from seashells and coral. Some of this Florida limestone is made of coarse pieces of seashell cemented together by lime very much as sugar cements a popcorn ball.

22. Limestone sinks, lakes, and springs.—Florida has much rain but few rivers. The rain, sinking through the sand, soaks out holes or caves in the limestone, which dissolves in water more easily than any other stone. (Figs. 19, 20.) The water, after sinking into these holes or caves, runs away under ground and may come up as springs, one of which, called Crystal Spring, is so large that a small steamboat floats on it. When the roof of one of these underground passages falls in, the hole is called a limestone sink, and it may become a pond or small lake. Florida has hundreds of such lakes.

23. A railroad over the sea.—West of the tip of Florida there is a long chain of coral islands, the Florida Keys, with Key West, the only town in the United States where no frost has been recorded. (Fig. 308.)

A railroad 117 miles long runs on concrete bridges from island to island all the way from the mainland to Key West. From there it is only 93 miles by boat to Havana.



Courtesy Tampa Board of Trade

Fig. 20. Palm trees, other tropical growth, and the water surface of a limestone sink in the Florida Peninsula. Fig. 19 shows how limestone sinks are formed.



Fig. 21.



Fig. 22. A swamp in Florida showing cypress trees and palm leaves. Branches of the cypress roots, called knees, stick up out of the water. What makes the growth so dense? What wild things live in such places?

Courtesy Tampa Board of Trade

Some of the people who live in Key West and at Tampa hunt in the neighboring waters for sponges. Standing in their boats they pull sponges from the rocky bottom with long poles. Sometimes they dive for them. An ordinary sponge, such as we see, is made of the soft skeletons of thousands of tiny sea animals that live together in one cluster.

24. Swamps and soil.—Florida is so flat that in many places the water cannot flow away; it stays and makes a swamp. In the southern part of Florida are the Everglades, the largest swamp in the United States. In periods of heavy rain, the water in this swamp rises several feet. In periods of drought much of it flows away slowly through the tall grass. Men are now at work draining parts of this and other Florida swamps to make farms. The swamp land is usually rich, because of the plants that have grown in the swamp and decayed there.

The sandy soil of that part of Florida which is not swamp is fine soil for watermelons and vegetables, but unless heavily

fertilized is not good for corn or grass. People who wanted to raise cotton, corn, or grass, had to go to other parts of the United States, so for a long time Florida remained almost unsettled. Look in the Appendix and see how many people there are per square mile in Florida. Compare it with Alabama, a cotton state; with Iowa, a corn state; or with Massachusetts, a factory state.

25. Winter vegetables.—In 1880, when the first railroad, the Atlantic Coast Line, was built from the northern states through to Florida, the express trains made it possible for garden produce to be sent quickly from Florida to the northern states. People then

began to grow lettuce, cabbage, early potatoes, watermelons, cantaloups, tomatoes, and other vegetables, which are shipped north into lands of frost during winter and spring. Thus New York and other northern places have fruits and vegetables for weeks and months before their own crops are ready.

A certain truck farmer in Florida planted lettuce in November, and it was ready to send to New York in January. As soon as he sold the lettuce, he transplanted tomato plants from a hotbed to the same ground. These tomatoes he shipped in March. Then, on the same ground, he planted potatoes, which he shipped in May. He next grew a big crop of velvet beans, which he fed to the mules that worked on the farm. The rich roots of the beans helped to fertilize the ground for the three crops of vegetables that he planted the following winter. (Sec. 43.)

The high freight rate for perishables from Florida to the North makes the vegetable business profitable only when the grower can get high prices. As only a few people can

pay these prices, there is often an over supply, and the shipments do not pay expenses. This is one reason why most of Florida is still forested. There is no large market for early vegetables, and profit from growing them is uncertain. The frost may come and kill the crop, and, at best, the season is short at any one place, for in a week or two after the crop begins to go to market another place farther to the north begins to ship a similar crop. Shipments from south Florida supply the market first, then in turn those from Tampa, from central Florida, and from St. Augustine. These are followed by crops of vegetables from Savannah, Georgia; Charleston, South Carolina; New Bern, North Carolina; and Norfolk, Virginia.

26. Oranges and grapefruit.—Oranges have been growing wild in some of the Florida woods for over three hundred years. The Spaniards, who settled St. Augustine in 1565, brought orange trees with them from Spain. No one grew these oranges to sell far away until 1880, when it was found that Florida oranges sold well, and that money could be made by shipping them to the North. Many orange orchards were then set out. Sometimes in winter the oranges freeze and the trees are hurt, but, nevertheless, orange-growing is now one of the chief industries of the state. Thousands of carloads of the golden fruit are sent north each year. It is a beautiful and interesting sight to see an orange orchard bearing yellow fruit and white



Fig. 24. Dots on the map show location of orange orchards. Why does Florida produce more oranges than Texas?

blossoms at the same time. Most of the grapefruit used in the United States come from Florida.

27. Tourists.—The warm winter that helps the people grow oranges and vegetables gives Florida another industry—the tourist industry. Many people from the Northeastern and North Central states take a vacation in midwinter. They can leave the snowdrifts of Chicago, Detroit, New York, or Boston, and in two days by express train reach Tampa, Miami, or Palm Beach, where they may bathe in the warm ocean water that flows out from the Gulf of Mexico. Many stop off at Pinehurst and Southern, N. C., and Aiken and Camden, S. C. Great hotels have been built for the thousands of Northerners who play golf, bathe, fish, race automobiles, and hunt game for a few weeks in winter. Thousands also go in automobiles, camping by the wayside.

28. Lumbering.—Most of Florida is still a great forest. At times the trains run for miles through unbroken woods. Lumbering is one of the main industries, and Florida is a leading state in the production of rosin and turpentine, which are called *naval stores*. These are made from the sap of the pine trees. Shiploads of lumber are sent to our Northern states and to Europe from Tampa, St. Marks, Jacksonville, and Fernandina.

29. Tobacco factories.—Florida has a kind of imported manufacturing in-



Fig. 23. Winter celery grown on the land from which palm trees have been removed. Where will it be eaten? Would such agriculture be possible at your home in winter? Can another crop be grown on this land in the same twelve months?

Courtesy of "The Country Gentleman"



Fig. 25. A large grapefruit grove near Tampa, Florida. What would this grove be worth if Florida could not trade with other states? Why does Florida need fast-freight train service?

Courtesy Tampa Board of Trade

dustry. Many Cubans live in Key West and Tampa, making "Havana" cigars from Cuban tobacco.

30. Phosphate rock.—Florida has no mountains, but she has a mining industry; that of digging phosphate rock for making fertilizer. It seems queer, but raw material for fertilizer is dug out of beds of sand which farmers would say were poor soil. How does this happen? Once upon a time the bones and droppings of birds and other animals that lived in this region formed lime phosphate. In this form no plant can use it, so it stays in the ground until we dig it up and treat it with acid in fertilizer factories. It is then called acid phosphate, and is the most common of all commercial fertilizers. All plants must have phosphate, and few soils have as much of it as the plants need. Hundreds of thousands of tons of phosphate rock are carried away each year by the ships that sail from St. Marks and Tampa to our own Atlantic ports and to Europe.

31. Unused resources.—Florida could feed ten, twenty, or thirty times as many people as now live in the state. To do this, it would be necessary to drain the swamps, which would make many thousand acres of good farm land, to fertilize the sandy soil, and to keep live stock, as the people are beginning to do in the Cotton Belt (Sec. 44). In this way, Florida might become a great state for the

production of beef, pork, and corn. At the same time she could keep on giving travelers a good time, and raising on a tiny part of her land all the oranges and winter vegetables that northern people would buy. Do you think this stock-raising would increase Florida's trade? Why?

QUESTIONS

1. Tell briefly how each of the following natural features of Florida helps her farmers to produce oranges and early vegetables: (a) Location in respect to great Atlantic coast cities. (b) Position in zones. (c) The Gulf Stream. (d) Location between two large bodies of water. (e) Surface. (f) Soil. (g) Rainfall (Fig. 158).
2. Would you rather live in your region or in Florida? Why?
3. Give two reasons for the fact that frost has never been recorded at Key West.
4. Suggest two causes for the development of Jacksonville; Tampa; Palm Beach.
5. How have the many lakes, few rivers, and large swamps hindered the development of Florida?
6. What is the population of Florida per square mile? (Appendix) of your state? Can you tell some reasons for this difference in population?
7. How does each picture in the section on Florida help you to understand the life of the Florida people?
8. Suppose Florida were entirely surrounded by land. How would its climate differ in summer? in winter?
9. How has the development of fast-freight service helped Florida to become a source of food supply for the other parts of the country?
10. What work could the immigrants who come to our shores do in Florida that would be of benefit to the peninsula and to themselves?
11. See which boy or girl in your class can write the best letter to the Bureau of Foreign and Domestic Commerce, Washington, D. C., asking for a copy of the Statistical Abstract for your school library. Find from this book the amount of lumber Florida produces. Give two reasons for the great forests in the peninsula.
12. With a little pile of damp sand make a model of the Florida peninsula. Indicate in some suggestive way the important products, cities, and railroads. (Fig. 309.) Show the Everglades, Lake Okechobee, and the Florida Keys.

THE COTTON BELT

32. The cotton crop.—Cotton is one of the best of all crops. It is easy to grow, it is easy to keep without spoiling, it is easy to send long distances by train or ship. When ripe it is not eaten by moth or bug or mouse.

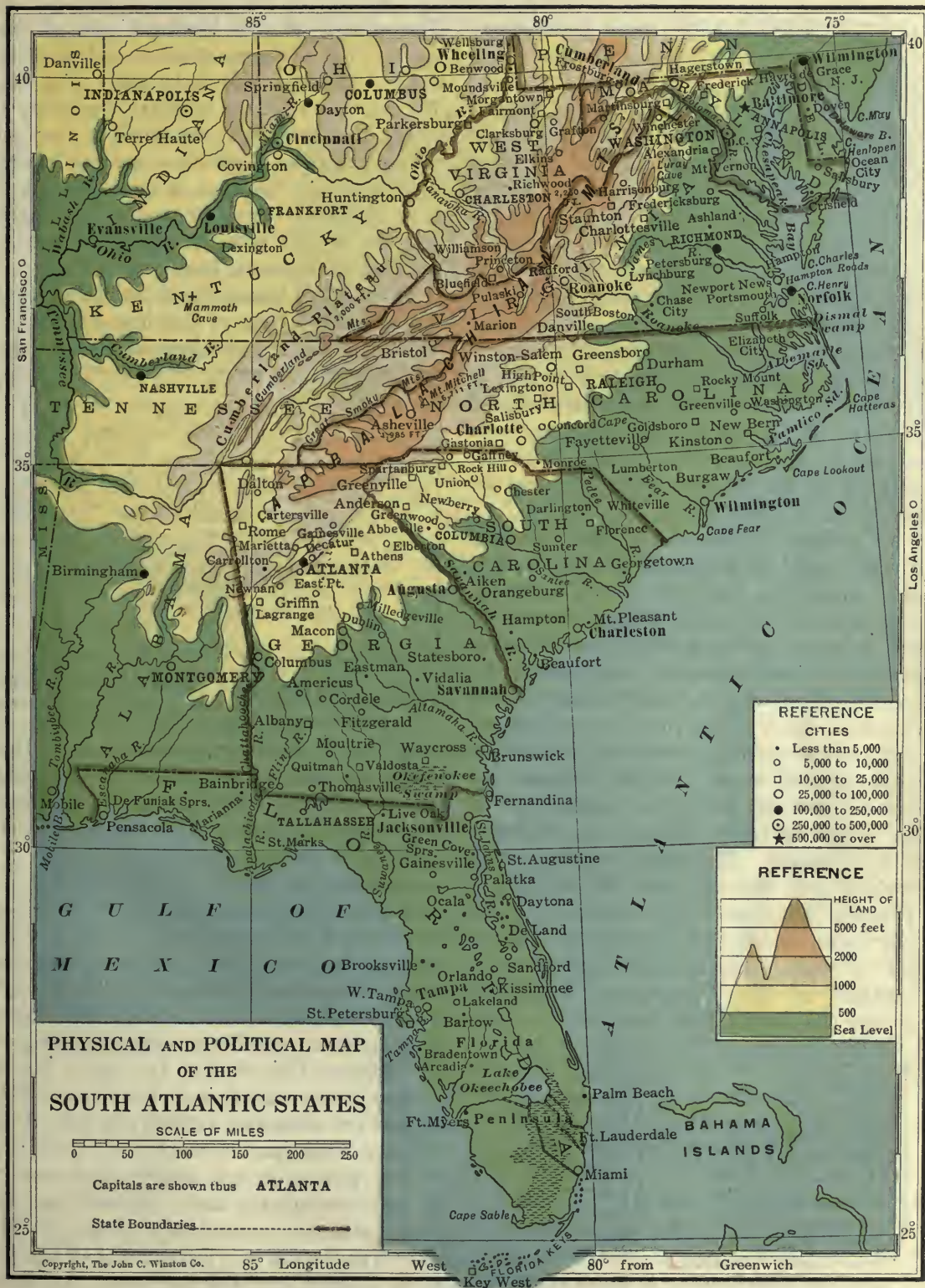


Fig. 26



Fig. 27. The Cotton Belt.

part of our southern states. This crop is so important that the region where it grows is often called the Cotton Belt. It is one of the largest and richest natural regions in the United States.

Figures 28 and 29 show that cotton grows in several countries, and the Cotton Belt of the United States is the greatest producer of them all. It grows more than half the cotton of all the world. Which states are entirely in the Cotton Belt? Which are partly in it? (Fig. 21.)

33. Bounds of the Cotton Belt.—What is it that causes the bounds of this Cotton Belt to be where they are? The answer is *climate*. Cotton needs two hundred days between the last frost in spring and the first frost in autumn. It needs a warm, moist summer for growing, and dry, sunny weather for ripening. Look at the cotton map (Fig. 30) and see how the line of two hundred frostless days, almost seven months, bounds the Cotton Belt on the north somewhat like an imaginary fence. Notice that this line is not straight. The warm weather of the lowland near the sea pulls the line up into Virginia, but the cooler weather of the plateau brings the line down into the central part of North Carolina, while the still cooler weather of the Appalachian Mountains pushes the cotton line down into Georgia.

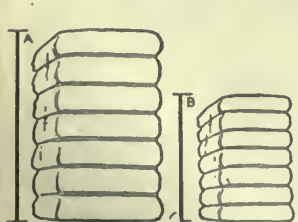


Fig. 28. Relative Size of Cotton Crops, 1919-1920: 500-lb. bales

A. United States, 12,200,000
B. Rest of World, 8,050,000

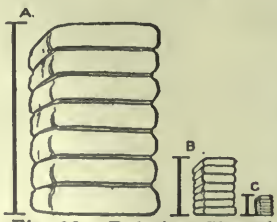


Fig. 29. Relative Size of Cotton Crops, 1918-1919: 500-lb. bales

A. United States, 12,200,000
B. India, 3,671,000
C. Egypt (1918), 1,262,000

Since nearly every people uses some cotton, it is easy to sell. Cotton is the main crop and the chief source of wealth in a large

The climate of the highland and of the lowland has the same effect upon the cotton line in Missouri and Arkansas. (Fig. 30.) We may say that the northern boundary is a cold line, because to the north of that line the cold weather of spring or autumn injures the cotton so often that it does not pay to grow it there. Such lines are not sharp, but are several miles in width because the weather is uncertain from year to year.

The western boundary of the Cotton Belt is a dry line. West of this line cotton does not pay, unless irrigated, because the droughts



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Fig. 30. What two facts of climate fence in the Cotton Belt? Note how the eastern grape districts cluster about the Great Lakes. Why? (Sec. 328.)

keep the plants from growing well. How much rain falls at the western or dry edge of the Cotton Belt? (Figs. 158, 494.) Why should a south wind bring rain to east Texas and drought to west Texas?

Look at the rainfall map (Fig. 158) and you will see that the rainfall grows less as we go west through Texas. The eastern part of that state, with the heavy rain, has thick forests and swamps, but the western part is dry, with few streams, thorny cactus plants, scattered bunches of grass, and low bushes. One side of this state has so much rain that it is in the Cotton Belt, and the other side so little rain that it has only large ranches, with few farms, and few people, except where water can be had to irrigate the land. We shall learn the cause of this dryness later. (Secs. 59-71.) The Cotton Belt is a cotton belt because it is warm and has rain every few days. These two climatic conditions are the best

for agriculture, because they enable people to grow things that are needed.

34. Cotton growing.—

In February, March, and April, the farmers with their teams and tractors are busy plowing and harrowing the ground and planting the seed. In the early part of the summer, men, women, boys, and girls may be seen with hoes, chopping out the weeds and some of the young cotton plants. The remaining plants stand about eighteen inches apart in the rows. All summer the mule-drawn cultivators keep down the weeds. In the autumn, the round pods, called bolls, begin to burst open and show the white cotton. Cotton-picking time, the busiest season of the year, has come. It is easy to grow more cotton than can be picked. Everybody who can goes into the fields to pick, even the cooks from the kitchen. From August until cold weather the pickers, with sacks hung upon their shoulders, go up and down the rows, plucking the white cotton, of which more than half the weight is seeds.

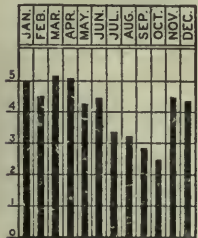
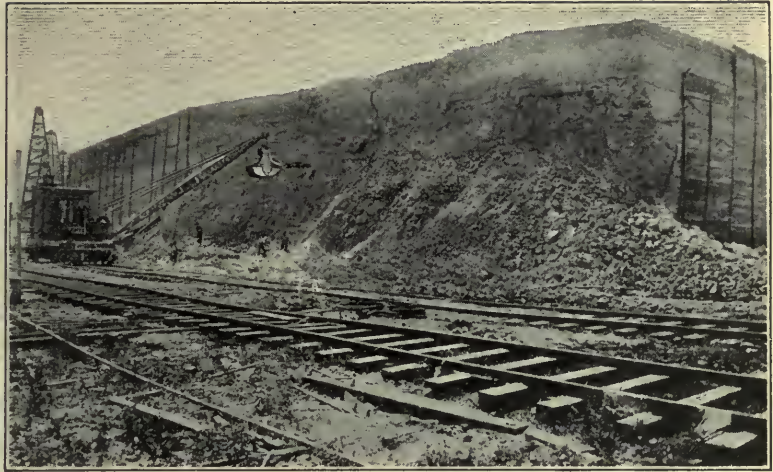


Fig. 31. Rainfall of Memphis—49.11 inches per year. The figures at the left show the inches. The heavy lines show how many inches per month. How many has January? December? Why is October a better month for cotton picking than November?

35. Ginning and market-

ing.—Before the cotton can be used for cloth, a machine called a cotton gin separates the fine white fibers from the seeds. Buildings containing cotton gins are scattered about the country only a few miles apart. To them the farmer hauls his cotton to be ginned and pressed into large bales. Throughout the autumn and winter one often sees wagons, loaded with bales of cotton, going from the ginnery to



Courtesy P. Geo. Maerck

Fig. 32. Sixty thousand tons of pure sulphur worth one million dollars, at one of the world's greatest sulphur mines, near the mouth of the Brazos River in Texas. A well is drilled and very hot water is forced down several hundred feet to the sulphur bed; the sulphur melts; it is forced to the surface by compressed air; then runs into bins where it cools as hard as rock. It is then broken up by blasting and loaded quickly and cheaply by steam grab buckets.

the railroad station or to the steamboat landing.

In the Cotton Belt, there is rain every few days all winter, the roads are often deep with mud, and the farmer's load must be small, unless he happens to live near an improved road.

The cottonseed is also a valuable part of the crop. It is crushed by very heavy rollers. The cottonseed oil that is pressed from it is used for canning small fish like sardines, for making oleomargarine, and for a cooking oil. The cake that is left after the seeds are pressed is ground into cottonseed meal. This is good food for cows, because it helps to increase their milk. It is used in the dairies of many northern states and of Europe.

How many navigable rivers are there in the Cotton Belt? (Fig. 80.) Name several. What ports are at the mouths of some of these rivers? Name some places to which ships go from these ports. (Fig. 21.)

36. Soil. — The Cotton Belt has many kinds of soil. In some places there are wide belts of clay, in others, belts of sand, a strip through Central Georgia having almost no cotton because sand is not rich enough. On this wide belt it is more profitable for the

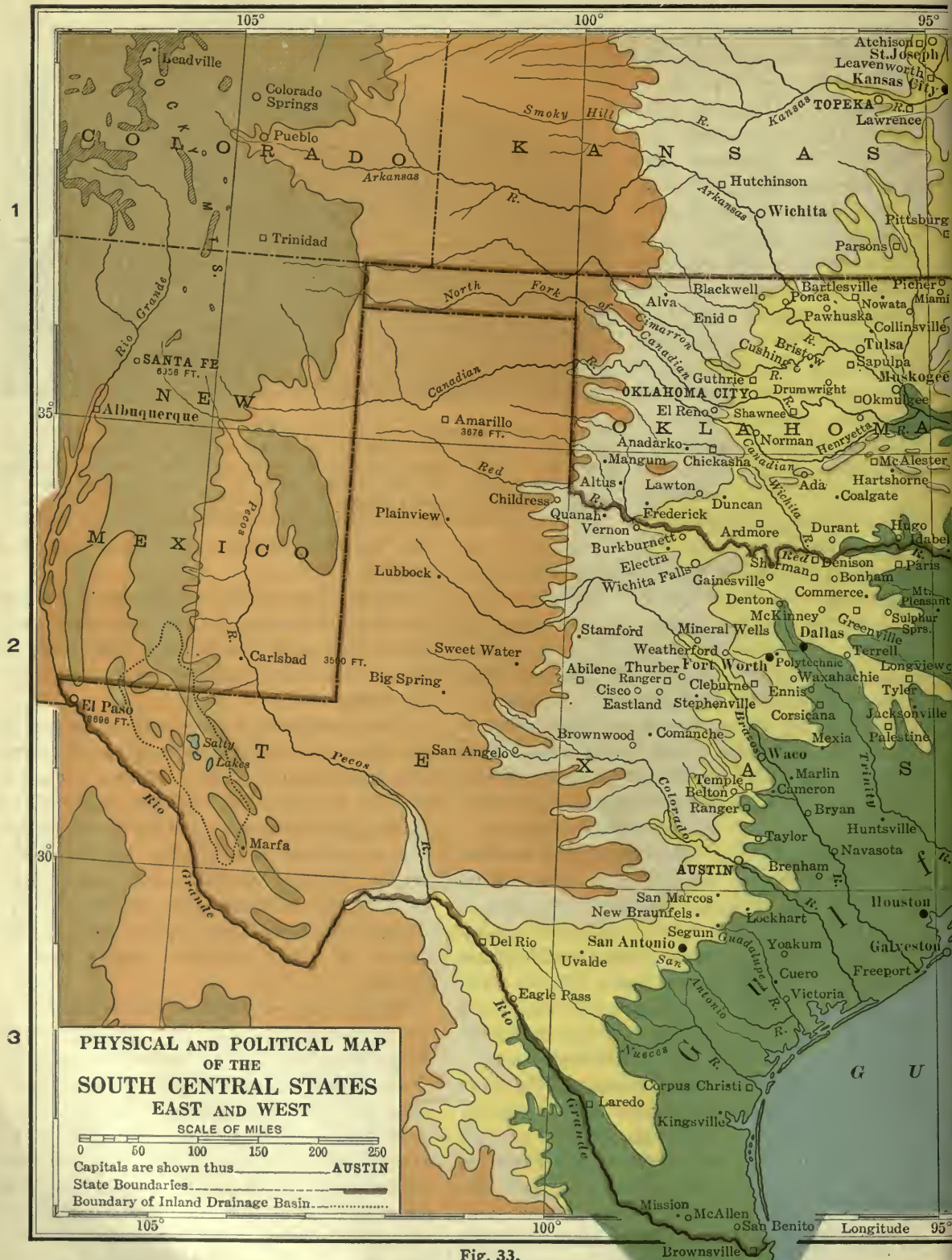




Fig. 33.



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Fig. 34. A cotton gin picking the seeds from cotton as fast as 200 men could do it. What is such a machine worth per day? Basket contains unginned cotton.

farmers to plant whole fields of peas, peanuts, sweet potatoes and watermelons, which do well on sandy soil. The melons go in carloads to northern cities in early summer.

Northwest of this sand strip is a wide belt of red clay hills. The blacker band on the cotton map shows that a great deal of cotton is grown here. The map shows other areas in central Texas and in central Alabama very rich in cotton. Both of these are extra fine cotton districts, because they have rich black soil made of decayed limestone rock, where the farmers can grow big crops of cotton year after year. In Texas the limestone belt is called the "Black Land" and the man who owns a farm there is wealthy. To the east of the Black Land, the land is sandy and often poor, and therefore much of it is still covered with forests of pine and other kinds of trees.

The limestone belt in central Alabama is called the "Black Belt". The soil is black, and so are most

of the people—negro tenant farmers, each renting a few acres of the rich black earth. This land sells for five or six times as much as the less fertile sandy land farther south, which, like the sandy land of Texas and southern Mississippi, is still almost all covered with pine forests. More than half of the area of the whole Cotton Belt is still in forest.

The map shows that a third region having much cotton is close to the Mississippi, on the rich delta plain made by the silt (mud and sand) which the river has been bringing down for thousands and thousands of years. This river-built plain gradually filled up the Gulf of Mexico, which once extended to where the mouth of the Ohio River now is. Each year the river dumps into the Gulf enough silt to cover 278 square miles with a layer one foot thick. It built the land from Illinois to the Gulf. This soil is so rich that cotton has been grown on the same field year after year without wearing out the soil.

There are no stones on this delta plain built of river silt. You can dig down a hundred feet and find only soft earth, or clay, or sand. In New Orleans, which is built on this low, flat plain, the water in



Photo. Underwood & Underwood, N. Y.

Fig. 35. Bales of cotton, covered with jute cloth, going on board steamer at a cotton port. What is a 500-pound bale of cotton worth? (See daily newspaper.) Name some of the places to which this cotton might be going. (Fig. 21.)

the ground is near to the surface. If a big, heavy building were set directly upon this soft earth it would sink, and the walls would crack. To prevent such trouble, piles (the trunks of trees) are driven into the ground, and on these the foundation walls are built.

37. Surface.—The surface of the Cotton Belt helps to make it a region good for farming. There are no mountains; only a part of it is hilly; and much of it consists of flat plains, which are very easy to cultivate. In fact, some of this region suffers from being too flat, for where the heavy rain cannot run away the land is swampy. There are many large swamps along the shore, all the way from the Dismal Swamp on the northern boundary of North Carolina to the mouth of the Rio Grande.

38. Floods and levees.—When the snows melt in the North Central States and in the Appalachian Mountains, and heavy winter rains come at the same time, the Mississippi River often overflows its banks and covers large areas of the level land that it has built. To escape the floods, many people have to leave their homes by climbing out of the windows into boats that have been brought to rescue them. These floods do such great damage that men have worked for years to build big banks, called levees, along the edges of the stream, to hold the water back in times of flood. (Fig. 36.) Sometimes the river rises even higher than the banks. Sometimes a muskrat or a rotten tree root makes a hole in the bank, and there the water breaks through the levee, tears a



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Fig. 37. A Cotton Belt field with rows of bushy peanuts between the rows of tall corn. Who will harvest the peanuts? (Sec. 42.) What other crops may be grown with corn? How many have you seen?

great gap, flows out as a rushing river, covers up hundreds and thousands of farms, and may make a lake as big as two or three of the smaller New England States combined.

39. Corn, sugar and truck.—Corn is the second crop in value in the Cotton Belt. It is grown on almost every farm, and it is likely to increase in quantity. Sugar cane is also grown in Louisiana at the lower end of the Mississippi delta, but the frost sometimes injures it, and this industry has not grown as the other Cotton Belt industries have. We shall read more about sugar later. (Secs. 382, 383.)

Over a considerable portion of the Cotton Belt where the soil is sandy, early vegetables are grown for the northern market. This region supplies the North Central States, just as Florida supplies the Northeastern States, but it does not take very much land to grow all the early vegetables that are required.

40. Peaches.—Georgia has an important fruit in-



Courtesy Mississippi River Levee Association

Fig. 36. How does it happen that the surface of the Mississippi River in northern Louisiana is higher than the land behind the river bank?

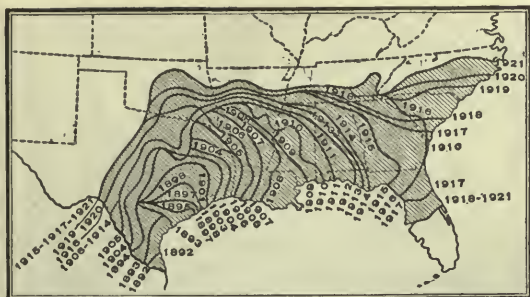


Fig. 38. Map showing position of advance line of boll-weevil army as it marched through the Cotton Belt.

dustry. In July she sends to northern markets hundreds of carloads of peaches. In August the same varieties of peaches are being shipped from the Potomac Valley; in early September, from western New York.

41. **The cotton-boll weevil.**—It is fortunate that many crops will grow in the Cotton Belt, for the cotton farmers have had a great trouble of late, caused by an insect called the cotton-boll weevil. These hungry little beetles eat their way through the unripe bolls, spoiling the cotton. They came across the Rio Grande from Mexico in 1892. Each year they have pushed their way farther and farther through the Cotton Belt, going twenty-five or fifty miles a year, injuring the cotton crops as they go. Men have not been able to stop them. Almost all that can be done is to grow cotton that ripens early.

Before the weevil came, many farmers had grown nothing but cotton, which they sold to pay for everything they used, even for the corn and hay for the mules. Cotton is *such* a good crop to sell! After the boll weevil came, farmers had to raise other things, thus the insect made the people change their farming by growing different crops.

42. **The new, or diversified, farming.**—One of the crops new to many farmers is the peanut, a plant that looks like clover and ripens its nut pods under ground. Sometimes the farmers harvest them and send them to market. Sometimes they let the pigs run in the field and root up the peanuts and eat them. This kind of harvesting is very cheap. Peanuts are rich food and fatten pigs very well.

Another wonderful crop is the velvet

bean. One velvet bean vine will sometimes cover a whole square rod of cornfield and climb to the top of every cornstalk, producing great quantities of leaves and beans, which pigs and cattle come and eat along with the corn. The peanuts are often grown in between the corn rows. So are several kinds of beans called cowpeas. All are eaten by pigs, and sometimes by cattle, right where they grow. This method of harvesting is called "hogging down," or "feeding down" crops. The practice has increased rapidly, so that towns which once sold cotton only, and bought their pork, are now sending whole trainloads of hogs and cattle to the markets. The raising of many crops on one farm is called diversified farming.

43. **Legumes, food, and fertility.**—Peas and beans belong to a wonderful plant family called legumes. On their roots, queer lumps are found. These lumps are colonies of little plants called bacteria. The bacteria on the roots of the legumes have the very useful trick of taking nitrogen from the air and letting the plant get it through the roots.

Nitrogen is necessary to the bodies of animals and plants. People get nitrogen chiefly from milk, cheese, eggs, nuts, beans, peas, and meat, and to a lesser extent from bread. The cow that gives us nitrogen in her milk or in

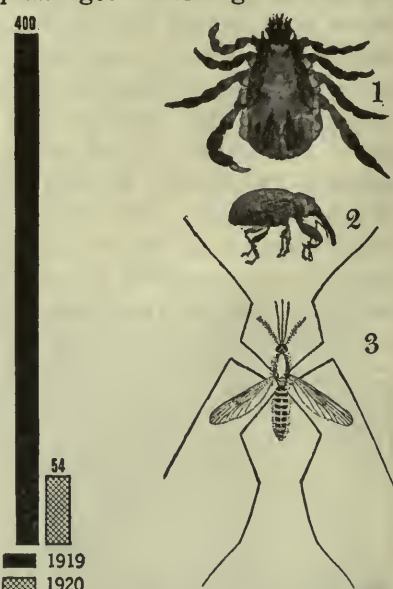


Fig. 39. Graph showing reduction in number of cases of malaria in an American town in one year, by fighting the mosquito (Number 3) which carries the disease. Number 2 is the Mexican boll weevil which eats the cotton, and Number 1 is the cattle tick which carries the Texas fever. (Sec. 44, Fig. 594.)

beef gets it from the plants which she eats. When there is not as much nitrogen in the soil as plants need to grow well, we say that the land is poor and needs nitrogenous fertilizer. We can get it in commercial fertilizer, which is costly, or we can plant legumes, which have tiny nitrogen factories on their roots. Phosphate and potash are two other foods needed by plants. These must be bought, but they are not as expensive as nitrogen.

Legumes get all the nitrogen they want, and more which they leave in the ground, so that the Cotton Belt farmer now plants in the same field with his corn or cotton, helpful legumes, such as soy beans, cowpeas, velvet beans, peanuts, vetch, or clover. After the corn or cotton crop is ripe, some of these legumes continue to grow, forming a thick mat of green growth above ground and rich nitrogen lumps below. After the corn is gathered, the pigs may come in and eat the other crop. Thus the farmer raises two crops in one field,—corn and pork,—and plows

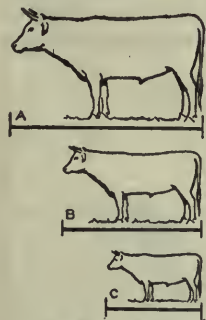
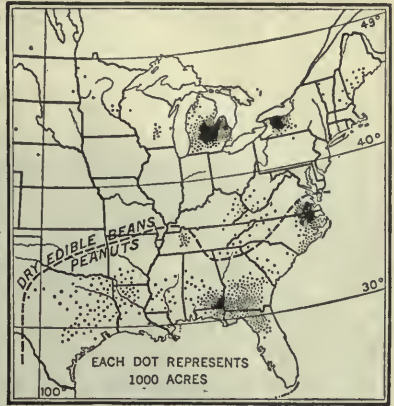


Fig. 40. Cattle (1912-1913)

A. India	115,980,000
European Russia	33,260,000
Argentina	28,900,000
B. Germany	20,550,000
Total	82,710,000
C. United States	57,240,000

under a mass of vegetation the next spring. This method makes the ground richer in nitrogen and manure than it was before the corn was planted. The parts of the plants that decay in the soil make a spongy black material called humus. This gives the soil a dark color, makes it light and spongy, helps it to hold moisture better, and to break up the fine particles of rock, so the plants can get the plant food that is in them. Humus is very important for plant growth. These

legumes now produce large crops of rich stock food on some of the level sandy plains of South Carolina, Georgia, Mississippi, Texas, and other parts of the



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Fig. 42. Where dry beans and peanuts are chiefly grown in the United States. Cotton Belt and Florida. In the snowy



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Fig. 41. Sugar cane likes rich land. What other favorable conditions are present in cane-growing regions?

northern states, cattle have to be fed in barns for half the year. In Mississippi, Louisiana and the rest of the Cotton Belt, barns are scarcely needed. Food grows nine or ten months in the year, and many crops, such as clover, vetch, and oats, are not hurt by moderate freezing.

44. The battle with the ticks.—The Cotton Belt is now one of the finest places in the world for producing meat. For a long while the cattle were small, sickly animals. Men have found that this condition was caused by a tick. This little animal when young is like a tiny spider. It lives by sucking the blood of animals, especially that of cattle. If it sucks the blood from an animal that has a kind of cattle fever, it carries the fever germs to the next animal which it bites, and thus spreads the disease. Men now destroy these ticks by dipping the cattle,—ears, horns, nose, and all,—under the surface of a tank full of liquid, which kills the ticks. (Fig. 594.)

45. Better health.—Science does wonderful things. In many, many ways it is showing us how to raise more and better plants and animals. It is also teaching us every day



Courtesy Galveston Commercial Association

Fig. 43. The city of Galveston built this concrete wall to keep storm waves from rushing into the city, which stands on a low sandy island. Why are stones piled at the base of the wall? In summer, the beach is crowded with bathers.

how to take care of our bodies, so that we can have good health and grow to be strong men and women. Among many other things, science has proved that one kind of mosquito carries malaria from one person to another, exactly as ticks carry fever from one cow to another. The Cotton Belt has so much rain that some places have swamps and mosquitoes. Since we know the cause of malaria, and can prevent it more easily than formerly, the people in the Cotton Belt have better health. The old danger of having malaria is disappearing.

Education helps health, and the Southern states are making great advance in education. This region was the leader in starting agricultural high schools.

46. Lumber industry.—When white men first came, the Cotton Belt was nearly all in forests of good timber. While these splendid forests last, the Cotton Belt is also a lumber belt. At times it has led all other parts of the

country in lumber output, and Louisiana is now second only to the state of Washington in lumber output. Tall, straight pine trees grow on the sandy lands of the Cotton Belt. Oaks grow on the clay hills and the rich lands along the streams. In the swamps, the curious cypress tree can live with its roots entirely under water, if only it can manage to stick out its knees. (Fig. 22.) From the cypress timber, shingles are made that last many, many years, and cypress is especially prized for use in-

side houses. The wood of the southern long-leaf pine is so hard that it is good for flooring, and for many other uses. When still harder and stronger wood is needed, we use the oak.

The Cotton Belt forests are on ground so smooth and level that wagons and trains can go almost everywhere at any season of the year. It is much easier to remove the lumber from these southern forests than from forests on the steep, stony, broken land in the mountains of the eastern

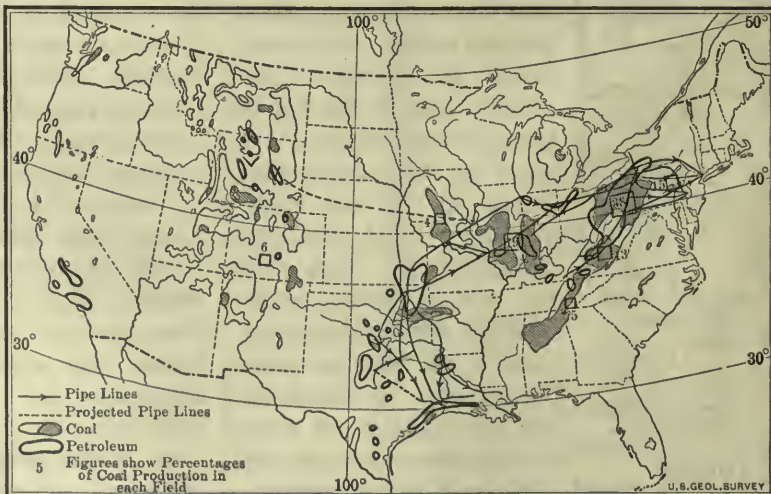


Fig. 44. Map to show distribution of coal and petroleum in the United States. Can you find from this map the states having neither coal fields nor petroleum? Have they water power?

or western regions. (Sec. 120. Figs. 253, 256.)

Sawmills by the hundreds are scattered through the Cotton Belt, and lumber is exported from every port between Galveston, at one end of the Cotton Belt, and Norfolk, near the other end. One of the greatest markets for hardwood lumber is Memphis, Tennessee. A few years ago, Gulfport, Mississippi, on the Gulf of Mexico, was shipping more lumber than any other port in the world. A very small place can export lumber.

All that is needed are a few wharves piled high with lumber, and a few hundred laborers to load the ships that lie alongside.

47. **Manufacturing and cities.**—Besides the great number of sawmills, there are many cotton mills. Indeed, the leading manufactures are cotton yarn and cloth. The cotton-mill industry has grown very rapidly since 1890. Most of the cotton mills are in the higher part of the Cotton Belt, around the slopes of the Appalachian Mountains. There the climate is



Photo. Bryant Studios

Fig. 46. A petroleum refinery at Fort Worth, Texas. How many things here hold oil? Name some uses for this oil.

a little cooler, and the rivers flowing down from the mountains have waterfalls to turn the wheels (Fig. 234). This beautiful rolling hill country near the mountains is sprinkled with thriving manufacturing towns from the northern edge of the Cotton Belt in North Carolina through the higher sections of South Carolina, Georgia, Alabama, and Mississippi. Almost every stream that comes from the mountains is harnessed for the work of lighting, or of transporting, or of turning the factory wheels. The South is justly proud of

the fact that the number of spindles in her cotton mills has grown much more rapidly in the last thirty years than it has in the northern cotton districts. Millions of Chinese wear cotton cloth from this region and the Southern members of Congress are now much interested in shipping and foreign trade.

When we study New England (Secs. 233-250) we shall see that her supplies of food and raw materials are not so good as



Photo. Charles L. Franck

Fig. 45. Steamers along the river front, New Orleans. What may be in the sacks? These ocean steamers tell the story of world-wide commerce.



Fig. 47. Perspective view of New Orleans looking toward the Gulf of Mexico. The Inner Harbor Navigation Canal, seen at the left, has greatly reduced the distance for shipping from the lake to the gulf. Name some things that are shipped from New Orleans. (Fig. 21.) Why do streams flow away from the river?

those of the South. Indeed, no other cotton manufacturing region has such a collection of materials—food (Secs. 42, 50), wood (Sec. 46), coal (Sec. 49), waterpower (Fig. 234), and, lastly, the cotton itself; for there outside the factory windows are the cotton fields. (Fig. 30).

Many Cotton Belt cities and towns have mills for crushing oil out of cottonseed, and cotton presses to press the cotton into small, tight bales convenient for shipping, and almost all ports and many inland towns have fertilizer factories making plant food for the farmers. Factory products are increasing (Fig. 234).

Not only is cotton manufacturing increasing rapidly, but the enterprising people are making a great variety of articles. By reason of the hydroelectric development, this part of the United States is becoming a manufacturing as well as an agricultural district. The 1920 census shows that city population is increasing faster than rural population. What does this suggest about manufacturing?

Each state capital has many thousand

people merely because it is a state capital. Atlanta is an important railroad distributing center and cotton market. The same is true of Dallas and Fort Worth, Texas, and also of Tulsa, Oklahoma, and Oklahoma City, each of which is a thriving city supplying a rich country, and giving increasing attention to manufacturing. The warm winter of the Cotton Belt brings thousands of tourists from the north each year.

48. Seaports and trade.—Most of the cotton manufacturing is done in towns and small cities. The larger cities are the seaports, which are busy with importing and exporting. Look at the regional map (Fig. 21) and at the United States map (Fig. 309) and you will see that the Gulf ports, not having mountain barriers behind them, can serve the heart of the United States quite as easily as any Atlantic port can. New Orleans has the steamboats on the Mississippi and its branches to bring it trade. New Orleans, Galveston, Port Arthur, Mobile, will have

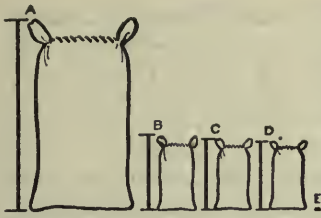


Fig. 48. Five leading rice producing states in the United States.

(1919-20) Bushels.

- A. Louisiana.....22,450,000
- B. California.....9,510,000
- C. Texas.....8,270,000
- D. Arkansas.....7,670,000
- E. South Carolina.....90,000

much greater trade in the future. How will the Panama Canal help this trade? The city of Houston is a great railroad center with railroads reaching all of the territory between the Rocky Mountains and the Mississippi and Missouri rivers. Galveston, the port through which much of the sea trade of this region passes, is the greatest cotton shipping port in the world. It also exports much wheat. From what states would the wheat naturally come? (Fig. 72.) Galveston and Mobile are the rivals of New Orleans as the southern gateway to the open center of the Continent.

Petroleum is found in Louisiana, Texas, and Oklahoma, and pipe lines (Fig. 44) carry it to the steamships on the Gulf Coast for shipment to northern cities. Where else do the pipe lines go? More will be said about petroleum later. (Secs. 190, 301.)

49. The future—manufacturing.—Alabama produces iron at Birmingham more cheaply than any other place in the world (Sec. 280), and rivals Pennsylvania in coal riches (Fig. 44). What other Cotton Belt state has coal? The United States is now the leading sulphur country because of the recent discovery of rich deposits near the Gulf Coast in Louisiana and Texas (Fig. 32). For manufacturing there are in addition the great raw materials of wood and cotton, and an agriculture to produce a wonderful variety of food. There is still much unused water power. The great plant at Muscle Shoals alone, near Florence, Alabama, will make several hundred thousand horse power and may send power to several states.

much greater trade in the future. How will the Panama Canal help this trade? The city of Houston is a great railroad center with railroads reaching all of the territory between the Rocky Mountains and the Mississippi and Missouri rivers. Galveston, the port through which much of the sea trade of this region passes, is the greatest cotton shipping port in the world. It also exports much wheat. From what states would the wheat naturally come? (Fig. 72.) Galveston and Mobile are the rivals of New Orleans as the southern gateway to the open center of the Continent.

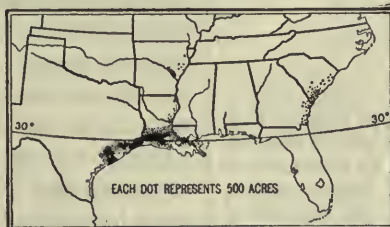


Fig. 49. Where rice is grown in the United States. Why does Florida with her sandy lands not grow rice?

50. The future—agriculture.—In the public square of the town of Enterprise, Alabama, the people actually erected a monument in 1919 to the cotton-boll weevil, because this destructive insect had compelled them to diversify their farming and get rich. This change had caused the district to grow legumes and ship hogs and cattle by the train-load (Sec. 42). This is typical of the new agriculture that is making the South a progressive part of the country with great agricultural development and possibilities.

51. Rice and pecans.—Two new Cotton Belt industries show how these states are advancing. Rice has been grown for two hundred years along the coast of South Carolina and Georgia. After being planted, rice needs to be flooded in order to give it moisture and to keep down the weeds. This is now done on the large level fields of Louisiana, Texas, and Arkansas (Fig. 49) much more easily than in the little ricefields of China and Japan (Fig. 491). Rice land west of the Mississippi is so level that it is easy to have ricefields that cover many acres. The water is kept on the fields by means of banks, which are made by turning up a few furrows with a plow. The water itself, which is found in layers of sand beneath the fields, is pumped up by oil-driven engines. When the rice is nearly ripe, the bank is opened, the water flows away, the ground dries, and the rice is harvested by reapers and threshed like wheat.

Nearly two million pecan trees have been planted in the Cotton Belt from Texas to North Carolina, since we have learned how to improve them by budding as we do apples or oranges. (Secs. 82, 87.) Make a list of the things which the Cotton Belt now exports to other regions or to

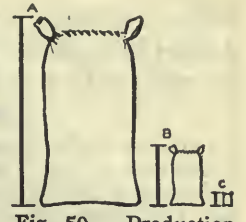


Fig. 50. Production of rice in bushels.

- A. India and Burma, 667,016,000 (1918)
- B. Japan, 214,800,000 (1918)
- C. United States, 48,250,000 (1919-20)

foreign countries; of the things it might export if more fully used. Make a list of the things the people there use, but do not make.

QUESTIONS

1. On an outline map of the United States sketch in the Cotton Belt. Indicate the important cities mentioned in this chapter; the navigable portions of the Mississippi River system (Fig. 80); a section producing rice, sugar, petroleum, forest products, much cotton. 2. How was the northern boundary of the cotton region determined? the western boundary? 3. Make a list of as many things as you can think of which are obtained from the cotton plant. 4. Give two good reasons for the extensive forests found in the Cotton Belt. Name three kinds of trees growing there. State the most important uses to which the wood of each kind of tree is put. 5. What conditions are favorable to the production of early vegetables? How in this respect is the region similar to Florida? Why does the Cotton Belt raise fewer oranges than Florida?

6. Why do the people of the South send most of their cotton to New England or old England to be manufactured? Might they manufacture more of it at home? What conditions there are favorable to manufacture? unfavorable? 7. Plan a trip to a cotton plantation in Mississippi. How far will you have to travel? How long will it take? What kind of clothing will you need? Through what states will you pass? Over what railroad or bodies of water? Write a letter from a plantation telling a friend about your journey. 8. Examine each picture in this chapter very carefully and fill out a little diagram like the following:

TITLE OF PICTURE.	SHORT DESCRIPTION.	HOW IT HELPS ME TO LEARN ABOUT THE COTTON BELT.

9. Make a list of the cities of the Cotton Belt engaged chiefly in manufacture, and state the relation which the location of each city bears to (a) source of raw material; (b) power; (c) means of transportation.

10. Put into the following outline the important facts you have learned about the Cotton Belt. You will then better understand why our country produces over half the world's cotton.

THE AMERICAN COTTON CROP.

NATURAL HELPERS	HOW EACH HELPS
Size of Region.....	
Location.....	
Surface.....	
Soil.....	
Temperature.....	
Rainfall.....	
Navigable Rivers..	
The Laborers.....	
ENEMIES	HOW THEY HINDER
?.....	
?.....	

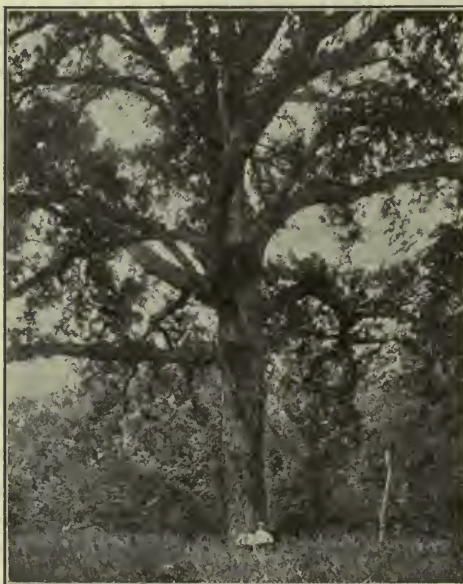


Fig. 51. A very large wild Texas pecan tree, a natural engine of nut production. Some idea of the immense size of this tree may be gained by contrasting it with the men beneath.

11. If the people of the Cotton Belt were shut off from communication with the people in other parts of the world, to what extent would they be able to be self-supporting? 12. Why has New Orleans become the metropolis of this region? 13. Write an imaginary conversation which might have taken place between a mosquito and a cattle tick that met one day on a Mississippi levee. 14. Arrange a pantomime in your class showing how the cotton-boll weevil compelled the cotton farmers to raise diversified crops. 15. What part has cotton played in the history of the United States?

CENTRAL FARMING REGION

PART I.—THE PRAIRIE CORN AND SMALL GRAIN BELT

52. The work of the glaciers.—Glaciers once covered most of the land north of the Ohio and Missouri rivers with great mountains of ice (Fig. 53), which changed the surface and made some of the land better than it was before the glaciers came. The glaciers began to form long, long ago when the winters in North America became longer and colder for a time. North of the Great Lakes it was so cold for such a long time that the snow did not melt but lay on the ground, even in summer. Each year it piled higher and higher until the mass was many hundreds of feet high. The weight of the snow on top

pressed the snow underneath into solid ice. Finally the pile began to move, somewhat as a pile of soft dough or putty slowly spreads out as it lies on a table. The huge mass, or glacier, pushed its way southward for hundreds of miles, until it reached the place where the sun was warm enough to melt the ice as fast as it pushed down from the north. At the place where the glacier melted there are piles of dirt and stones that have been carried along with the ice. These rough places are called terminal moraines.

As the glacier scraped over the basins of the Great Lakes, and out across the Prairie Corn and Small Grain Belt, it wore off the tops of the little hills and filled up the little valleys with the hilltop earth, thus making the country nearly level. This process made the land easier to cultivate, because it was not so hilly as it was before the ice came. The hilly region of the Ohio Valley begins where the glacier stopped.

53. **When the white man came.**—About the time of the Revolutionary War white men began to explore central Ohio, central Indiana, and eastern Illinois. The country was nearly level, and much of it was covered with thick forests of big trees—oak, hickory, elm, and many other kinds. Here and there were open, grassy meadows called prairies, where buffaloes pastured and deer ran wild.

For a hundred years the white man was busy cutting down these forests to make room for fields. To clear the ground, the splendid logs were often rolled into huge piles and burned. Ditches were dug to let the water drain away from the many swamps and marshes that covered the level parts of the land. Now the entire region is a land of farms and small towns, and one may often go many miles without finding even ten trees of the vast forest that once was there.

To the westward, in central Illinois, Iowa, Nebraska, and Kansas, there were trees only along the streams. The rest



Fig. 53. Map showing the part of North America covered by the ancient continental glacier.

of the land was level or gently rolling, and grass covered, called prairie. Since the pioneers from the east had always lived in a country naturally forested, they thought that treeless land was worthless; but after a time they found that it was the best land of all, being rich and ready for the plow, without requiring the hard labor of clearing off tree roots, stumps, and stones.

54. **Making roads and railroads.**—Between 1850 and 1860, railroads were built across the Mississippi and into this treeless, grassy, prairie region. The land, which belonged to the United States Government, was so level that surveyors from the Land Office at Washington often laid off roads in straight lines, running north and south, east and west, each road being one mile distant from the next. Thus the land was divided into blocks, each one mile square. Each of the square miles was then divided into four farms of 160 acres each, and a farm was given free of charge to any settler who would come and make his home upon it. Every year for many years, thousands and thousands of families left the hilly eastern country and moved out to these free farms on the fertile prairies. That is one of the reasons why there are so many abandoned farms in the eastern part of the United States.



Fig. 52. The Central Farming Region.

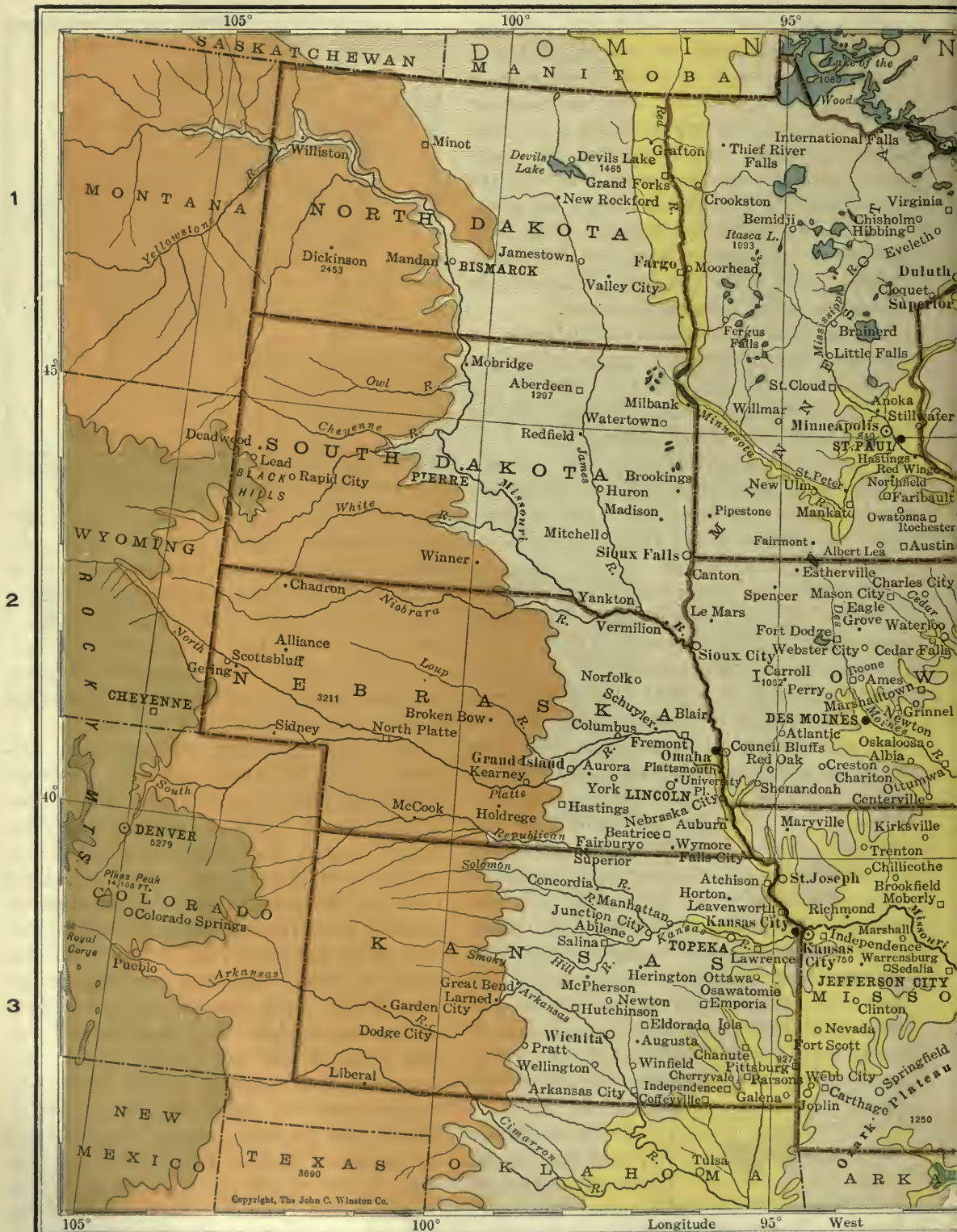


Fig. 54.



Fig. 54.



Photo. Eugene J. Hall, Oak Park, Ill.

Fig. 55. Barns, house, silo, cornfields, and potato field on a farm at Wayne, Ill.

55. Soil and surface.—The soil of the prairies is mostly deep clay, almost free from stone, and much richer than the sandy lands of the South. It is splendid for crops, but bad for roads, because clay makes mud when there is rain. There are often no stones in the prairies with which roads can be made, and it is too expensive to bring stone from long distances. Even to this day in neighborhoods where land is worth as much as \$200 to \$300 an acre, the roads are much poorer than they are in the Appalachian Valley (Sec. 274), or in the North Atlantic Coast Plain where gravel banks make good road material.

56. The name.—This level land of fertile soil is called the Prairie Corn and Small Grain Belt, because almost every farmer there grows corn and nearly always one of the small grains also, wheat or oats. Corn is the most important crop of all, partly because the soil and climate suit it so well, and partly because corn yields about twice as many

bushels to the acre there as does wheat. Corn, wheat, and oats are all grown in other regions also (Figs. 56, 72, 90, 93), but no other region grows so much corn as this one.

57. Bounds.—On map, Fig. 21, find what regions bound the Prairie Corn and Small Grain Belt. Which are lower than this region? Which are higher?

The western boundary is set by a line where little rain or unsuitable soil stops the good corn crops. (Sec. 104). Its northern boundary is set by a region with a shorter summer, where the growing season is not long enough for corn to ripen, or where the nights are too cool for such a crop. The Great Lakes are so large and deep that their waters stay comparatively cool all summer. Because of the breezes from the cool waters of Lakes Michigan and Erie, the farmers along their shores do not grow much corn, although cornfields thrive a few miles back from the lakes.

58. Climate.—In winter the Prairie Corn and Small Grain Belt is a land of frost and snow, of sleds and skates. In the northern parts the streams and lakes are covered with ice for many weeks each year. In summer the weather is as warm as that of the Cotton Belt, but the season between frosts is not so long. It is too short for cotton, but not too short for corn. Both of these useful plants need a warm, moist summer, but cotton needs seven months while corn can grow in five months.

How does it happen that the Corn Belt and the Cotton Belt have so much rain, while the region to the west has so little?



Fig. 56. Corn acreage of the United States and Canada. What two climate lines are close to its edge?



Courtesy Studebaker Corp. of America

Fig. 57. The Studebaker manufacturing plant, South Bend, Indiana. Wagons, carriages, automobiles, and machinery are manufactured here. How far is South Bend from Chicago?

To understand this difference in the weather we need to know about the storms which make the rainfall in this part of the world.

59. The cyclonic storms.—Strangely enough, there is system about these storms. They work according to rules, and usually follow about the same paths. They may start anywhere between southern Texas and Alberta (Figs. 91, 94). But no matter where they start, cyclonic storms in the United States travel from the west, work easterly, and pass off to the northeast. (Fig. 65.)

If you should ride above one of these storm areas in an airplane, you would see the wind blowing the tops of trees in the same direction that the arrows point. (Fig. 59.) What direction is that? The wind twists around a center. Is the twist in the direction taken by the hands of the watch?

The center of this storm is near Kansas City. The wind blowing toward it from the south crosses Louisiana and Mississippi, and brings moist air from the Gulf of Mexico. The wind blowing toward it from the southwest crosses western Texas, and is therefore hot and dry. The wind blowing toward it from the northwest comes from Nebraska and Dakota. It is cool and dry.

60. The rainfall.—Now it so happens that the air blows in toward the center of this storm, and then goes up a mile or two above the ground (Fig. 66). In going up the air becomes cooler. Since cool air will not hold as much moisture as warm air, some of the water is squeezed out of the air and

falls as rain. Look at the northwest and southeast quarters of the storm, Fig. 59. What are the wind directions in each? Which quarter has the more water for making rain? Why? Which is warmer? Why?

61. The cyclone.—These storms are called cyclones because they turn like a wheel or cycle. They twist round and round as they go across the country. These storms are not the same as those popularly called cyclones (Sec. 72). Each one is several hundred miles across. One or two are crossing the United States all the time. They bring the rain to the Cotton Belt and to the Prairie Corn and Small Grain Belt.

62. The movement of the storm.—Figure 60 shows the same storm the next day. It has moved eastward, and is now central east of the Mississippi River.

Look at the place on the Mississippi River that had a southeast wind the first day.



Finch & Baker, U. S. Dept. Agr.

Fig. 58. Swine in the United States. Compare this with the corn map (Fig. 56). Why does Illinois have fewer swine than Iowa? (Sec. 75.)



Fig. 59. Cyclone center, cyclone area, and cyclone wind directions.

What wind has it the second day? Where does this wind come from? Which of these two days is cooler at this place? Eastern Kansas and Nebraska had rain the first day. They have clear weather on the second day. But the places to the south and east of the storm center are receiving winds from the sea, winds that are full of moisture for making rain.

The third day (Fig. 61), our storm has passed to the St. Lawrence Valley, and the moist rain wind is blowing across southern New England and Nova Scotia, and the dry clearing wind is blowing across the Great Lakes and the states to the south.

63. The storm crosses the ocean.—Figure 62 shows that the storm has gone out over the sea east of Newfoundland. It blows the ocean into waves that rock and roll the ships at sea.

We can trace the path (Fig. 62) that the cyclone has followed from the Pacific Ocean, across the valleys of the Columbia, the Mississippi, and the St. Lawrence rivers, and out into the Atlantic Ocean.

These storms sometimes cross the Atlantic and pass over England and France, Germany and Russia, and on into Asia. Meanwhile, another storm and yet another are following along behind.

64. When a cyclone passes.—When a low pressure area is approaching, the wind is sucked in from the south and east and the

weather becomes warmer. When we are in the center of an area of low pressure the winds vary, and the warm moist air of the cyclonic area, becoming cool as it rises, cannot hold as much moisture, and either rain or snow falls. When the cyclone has passed on, the cold wind blows from the northwest or west, and the temperature falls. In a few days another storm comes. Thus every few days in summer the needed rain comes to the cornfields and cottonfields. Now you see why all the eastern part of North America gets good rains, and why the ocean between New England and old England is so often stormy.

65. The prevailing westerlies.—Why do the cyclones travel eastward? It is because the United States is in the cool northern zone, where the prevailing wind blows from the west towards the east. Naturally the cyclonic storms, which are just big, twisting eddies, are carried along by the more powerful stream of the prevailing wind, just as a little whirling eddy is carried along in a flowing stream of water.



Fig. 60. The same cyclone as that of Fig. 59 one day later.

66. Air pressure and the barometer.—We wonder what it is that starts the cyclone. Let us try an experiment. Light a short piece of candle and set it up in a lamp chimney or even in a paper tube. The candle heats the air, which becomes lighter, rises, and draws other air in to take its place. You can see these movements of the air by holding a smoking piece of paper near the bottom of the lamp chimney.

Sometimes the



Fig. 61. Where the same cyclone was two days later.



Fig. 62. The same cyclone three days later, and the path it has followed.

air becomes light over a part of the earth's surface, just as it does over the candle. The weight of the air is measured by an instrument called a barometer. If the air is heavy, the barometer is said to be "high"; if the air is light, the barometer is said to be "low". On the average, at sea level the air presses about fifteen pounds to the square inch.

67. The high barometer and the low barometer.—If the barometer is high, the pressure of the air may be fifteen and a half pounds per square inch, or 2232 pounds to the square foot. If the barometer is low, the pressure of the air may even be 100 or 150 pounds less per square foot. That is a great pressure difference. Now if the barometer in one region, let us say in Kansas, becomes low while the barometer is high on all sides, there is less pressure on the farms of Kansas than there is on the farms in Dakota or Louisiana. It is like the experiment with the lamp chimney. The heavy air around the lamp chimney rushed in to take the place of the lighter air. That is just what happens in our cyclone (Fig. 66). The heavy air in Dakota and Louisiana flows toward the lighter air in the center of the "low" in

rushing toward this center, twists around, much as water twists when it runs out through the hole at the bottom of a basin or of a bath tub, or through a round hole in the bottom of a tomato can.

These great twisting cyclones, several hundred miles across, are pushed along toward the east by the prevailing westerly wind. How long did it take those in Fig. 65 to go 1000 miles?



Fig. 63. The same cyclone, and "H", the cold wave or high area following it.

69. The cold wave.—The cyclone, with its warm weather and its rain, is not the cause of all of the rough weather we get. The cold spells called cold waves are quite another thing. Cold waves are caused by an area of heavy air or high barometer, which is, as you know, the opposite of the cyclone or



Fig. 64. The same cyclone and cold wave one day later. (Fig. 63.)



Fig. 65. Paths of six lows, or cyclones, in March, 1921. Dots show center at 8 a. m.; figures give dates.

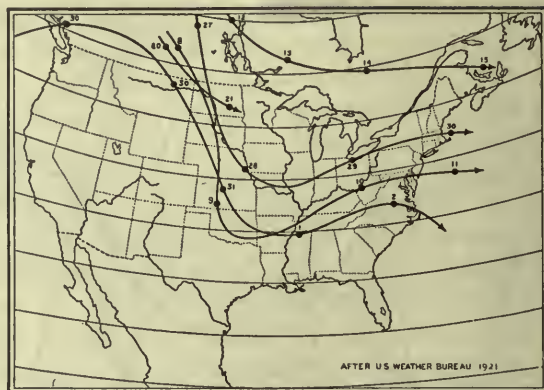


Fig. 67. Paths of five highs, or cool waves, in March, 1921. Dots show center at 8 a. m.; figures give dates.

“low.” In Sec. 67 we learned that a high barometer may show the air to be more than one hundred pounds heavier to the square foot than is the air in a place where there is a low barometer. When this is so, the heavy air flows out in all directions from the high barometer, just as water does when you pour it into the middle of a flat dish. As this air comes down from above it has but little water, and, therefore, it makes clear weather as well as cool weather.

Fig. 63 is the same as Fig. 60, except we see also in Fig. 63 the high barometer, or cold wave, which brings clear weather to follow the low barometer, or warm rainy time. On this map, the cyclone is central in Kentucky and the cold wave is central in Montana, with a northwest wind blowing from the cool high toward the warm low or cyclone. Fig. 64 is the same as Fig. 61, with the cold wave added. We see that the cyclone has gone on to the St. Lawrence Valley, and the cold wave has reached the Cotton Belt. The north wind and the northwest wind are now

blowing clear and cool where two days before the weather was warm and rainy.

70. *The weather procession.*—It is these two barometer brothers, the high and the low, that give us our weather,—warm with rain when the barometer is low, and cool and clear when the barometer is high. This pair follow each other across the United States in a procession that never stops, for as soon as a low goes off to sea, or dies out, a high comes along after it. The high in its turn, passes off to sea or dies out, and another low follows it. Thus, on and on, on and on they go, never stopping, for hundreds and thousands and millions of years. The United States Weather Bureau at Washington prints a map every day showing the weather as it is at eight o'clock in the morning. Such a map is shown at Fig. 156. Perhaps you can get some of these maps for your school, if you write to the Weather Bureau at Washington, D. C., for them. When you write you might also ask where the nearest weather bureau is.

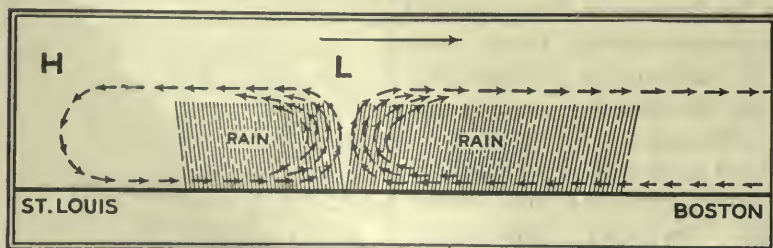


Fig. 66. The directions of air currents and the location of rain area in a cyclone crossing the United States.

71. *The thundershower.*—To understand how much the cyclones help the Prairie Corn and Small Grain Belt, we need to know one thing more about the rain. In winter these cyclones usually cause it to rain or snow all day. In the summertime, however, a cyclone



Fig. 68. Five leading corn-producing states, 1919-20:

	Bushels
A. Iowa.....	444,900,000
B. Illinois.....	297,580,000
C. Nebraska.....	219,850,000
D. Indiana.....	179,910,000
E. Missouri.....	177,104,000

often gives us hot, muggy weather, with sunshine most of the day but with a thunder shower in the afternoon.

In summer the cyclones advance eastward more slowly than in winter, because the westerly wind is weaker in summer. The air near the earth becomes very warm, because the surface of the earth is heated by the sun. The heated air expands and gets light so that a few cubic miles of it are pushed up by the heavier, cooler air, very much as a piece of wood floats in a tub when water is poured in. As this air goes up, the pressure on it grows less, with the result that it expands. Expanding cools it again. To see that air is cooled by expanding, let a little of the compressed air out of an automobile tire or bicycle tire, and notice how cool the escaping air feels. Since cool air will hold less moisture than warm air, big white clouds form in the heated air that rises on a summer day, just as little clouds form over the spout of the boiling teakettle. Sometimes the water falls as rain; hence the thunder-shower.

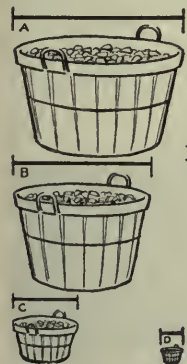


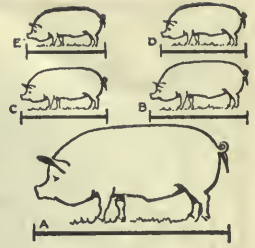
Fig. 69. Bushels of corn (1919-20):

A. Ohio.....	162,440,000
Indiana.....	179,910,000
Illinois.....	297,580,000
Iowa.....	444,900,000
Missouri.....	177,140,000
Kansas.....	103,440,000
Nebraska.....	219,850,000
South Dakota.....	98,400,000
	1,683,650,000

B. The rest of the United States.....	1,361,750,000
C. Europe (1912-13).....	632,665,500
D. South America (1918-19).....	213,790,000

Fig. 70. Five leading hog-producing states, 1919-20:

	Number
A. Iowa.....	10,416,000
B. Illinois.....	5,438,000
C. Indiana.....	4,622,000
D. Missouri.....	4,467,000
E. Ohio.....	4,287,000



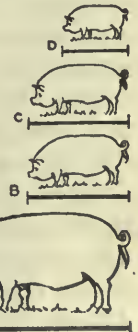
stroke a cat's fur in cold weather you can see sparks of electricity and hear them snap. The sparks that you see are really very small flashes of lightning.

One big summer cyclone may cause fifty or even a hundred thunderstorms to occur in a single afternoon. They may be scattered over three or four states, each one may be only two or three miles wide, but it may wet a strip many miles long because the wind blows it forward. The storm pours down rain as it goes. Often one farm will get a soaking rain, while a farm a mile away will get only a sprinkle.

72. The tornado is a very small cyclone blowing with terrible force. Sometimes when the thunderclouds form in the level country of the central part of the United States, the thundercloud rises very quickly, and the air rushing in to take its place is set whirling in a small area, like the water when it goes out of the bottom of a washbasin or out through a hole in the bottom of a can. These small whirling storms are called tornadoes; they are the most terrible storms of all. Nothing can stop them. Sometimes they blow down houses and barns, uproot big trees and carry men and horses for long distances through the air. Fortunately these tornadoes are rarely more than a quarter of a mile wide, usually less than that, and extend only a mile or a very

Fig. 71. Hogs (number), 1919-20:

A. Europe.....	68,596,000
B. Ohio.....	4,287,000
Indiana.....	4,622,000
Illinois.....	5,438,000
Iowa.....	10,416,000
Missouri.....	4,467,000
Kansas.....	2,143,000
Nebraska.....	3,595,000
South Dakota..	1,713,000
	36,681,000
C. Rest of the United States.....	36,474,000
D. South America..	24,437,000



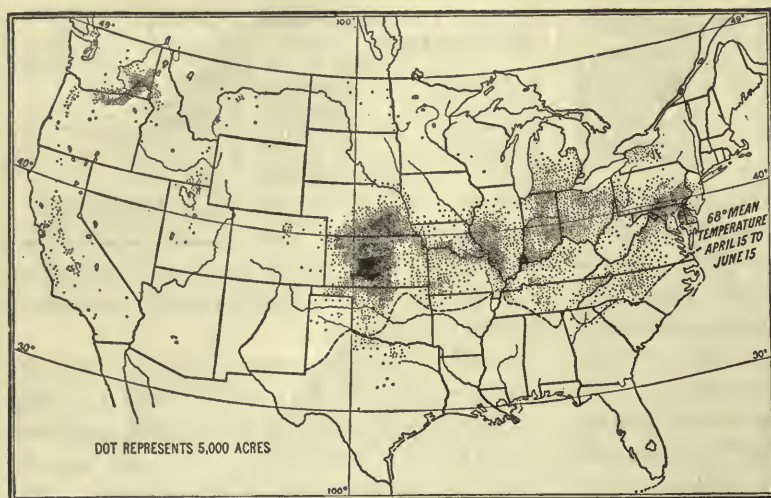


Fig. 72. United States winter wheat acreage. Note a climate line.

few miles. It is fortunate that they seldom occur. Out of 1000 thunderstorms, 999 bring merely rain and cooler weather without a tornado.

73. The thundershower and summer rain.—The thundershowers provide most of the summer rain in all of the states east of the Mississippi River. They are very good for crops because they give moisture; but since they are soon over, their clouds do not for long keep away the sunshine which is so necessary for good plant growth. Taken all together, the Prairie Corn and Small Grain Belt has a climate which is very favorable for the farmer.

74. The four-crop farm.—Look at the resources this region possesses: rich soil; smooth, nearly level land; good rainfall, and a healthful climate. No wonder it is the greatest food-producing region in North America.

Many of the farms in this great region are still one-fourth of a square mile in size, and contain 160 acres. The farmer often has four fields—one field in corn, one in wheat or oats, one in hay, and one in pasture. Sometimes the farmer has no pasture field, choosing in-

stead to have two fields of corn. Why does he raise several crops? Because in this way there will be work at different seasons for himself, his teams, and his machinery. By raising several crops, he has more steady employment, since the crops need attention at different times.

A farmer often plans his work as follows. In spring, when the snow melts, and the ground dries so that it can be worked without becoming lumpy, the farmer,

while the weather is yet cool, prepares his last year's cornfield for oats. Oats like cool weather. Next, he plows a field for corn, and when all danger of frost is over he plants that heat-loving crop. The oat crop requires no work from planting time until harvest, so the months of May and June are free for busy times in the cornfield. The young corn plants must be cultivated repeatedly to keep out the weeds, which otherwise would take the plant food away from the corn. By late June or early July, when the weeds in the cornfield are killed, the corn plants are as high as the farmer's waist and need



Courtesy International Harvester Co.

Fig. 73. A hay loader at work in Iowa. The two-wheeled rake in the rear piles the hay into a long windrow or pile. The loader drags the hay up the incline, and the men spread it on the wagon.

no more care until harvest-time. Wheat, oats, and hay now ripen, and the farmer is very busy cutting these crops and putting them into barns or stacks.

Soon the threshing machine, drawn by a tractor that is to run it, comes groaning up the dusty road to thresh the oats or wheat.

In August the Corn Belt farmer has a little vacation, and can cut the weeds along the roadside, repair the fences, and visit his friends. In September, October, and November, he is busy again, harvesting the corn and planting winter wheat. The farm wagon must be filled many times to take the ears of corn from the field to the corncrib. Sometimes there are as many as eighty or one hundred bushels on each of the acres planted in corn. As you travel through Ohio, Indiana, Illinois, and Iowa in the summer, you see fields of corn, corn, corn, until you wonder what can be done with it all.

In the central and northern parts of the Prairie Corn and Small Grain Belt, the farmer usually grows oats in addition to corn, because (1) oats love moisture, and do well in cool places; (2) they usually follow corn in the scheme of crop rotation, and (3) they are used as the feed crop for work animals. In the southwestern part of this region, a farmer usually raises wheat, much wheat, instead of oats, because it does well

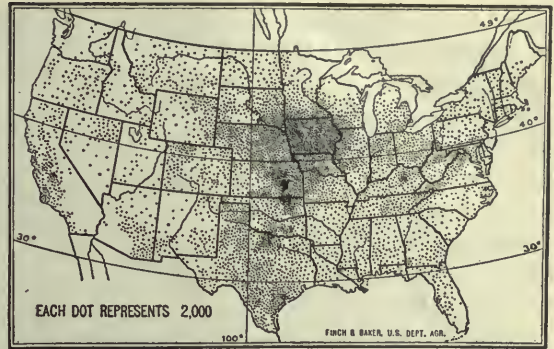


Fig. 75. Distribution of beef cattle in the United States. Compare with the corn map, Fig. 56. Can you find the Kentucky Blue Grass District?

with less rain than corn or oats require. Here wheat is planted in the autumn, lives through the winter, and is harvested in June and July.

75. Farm animals.—In the eastern part of the Prairie Corn and Small Grain Belt, near Chicago and other markets, the farmer often sends his corn, oats, and hay to the city to be sold. But farther west, in Iowa, Missouri, Kansas, and Nebraska, most of the corn, oats, and hay are fed to the animals on the farm, so that instead of having to pay freight on ten pounds of corn and hay, the farmer pays freight on only one pound of pork or beef. The animal, you see, is an economical way of sending the bulkier produce to market. The maps of corn production and hog production (Figs. 56, 58) show

that this grain and these animals are produced in the same places; indeed, the corn may be said to make the pork.

Corn also makes the beef and mutton. Each year hundreds of thousands of sheep and cattle come east by train from the ranches in the dry western country to the Corn Belt farms, to eat and become fat. In July a farmer may have no animals except his team, but late in summer he may buy sixty cattle or five hundred sheep to be fat-



Courtesy International Harvester Co.

Fig. 74. Horse power cuts the hay, rakes it up, hauls it to the stack and pulls the rope (at right) that lifts and drops the hay on the stack.

tened in the winter and sold in the spring. These animals arrive lean, but after a few months of fattening on the Corn Belt farm they are sent on to the meat-packing plants in the cities, especially to Chicago, Cincinnati, St. Louis, Kansas City, and Omaha. There a pig or an ox is made into more than a hundred different commercial products. Nothing is wasted. Even the bones are made into knife and brush-handles, buttons, and bone meal for fertilizer.

76. Cities.—There are few very large cities in this region. (Figs. 21, 54.) The nearly level farmland on the Prairies makes it easy for railroads to reach any point; therefore, in this region one place is about as good for a city as another. It is for this reason that many of the cities are about the same size. Columbus, Indianapolis, Kansas City, Omaha, Des Moines, and Topeka are railroad centers for shipping corn and animals from surrounding farms; each has meat-



Courtesy National Cash Register Co.

Fig. 77. An airplane view of the plant of the National Cash Register Co., Dayton, Ohio. Name the cities of Ohio which are larger than Dayton. Locate each. Which has the best opportunity for trade?

packing plants, factories for making farming implements, and many wholesale and retail stores to supply the surrounding country.

St. Louis has become larger than any of the other cities, because there steamboats can help the railroads with the traffic. The city has a great wholesale trade with the rich region to the southwest. It has a lumber supply from the Ozark Plateau (Fig. 21), and its factories, employing thousands of people, manufacture machinery, shoes, clothing, and many other articles.

St. Louis has not grown so rapidly in the last twenty years as have Chicago, Detroit, and New York, which are located where summers are cooler, and where deep-water steamships can help to move freight. (Fig. 315.) We shall find later (Sec. 321) that Chicago, which is just outside the Prairie Corn and Small Grain Belt, is largely supported by products from and trade with this region.

77. Extending the Corn Belt.—The area of the corn country is increasing because people are learning to grow corn farther north and farther west. New and improved varieties of corn are being found, some of which need less water than the old varieties. (Sec. 108.) For this reason the Corn Belt is steadily creeping westward into the land of less rain.

Some new varieties grow more quickly than the old varieties, and therefore can



Photo. Louis R. Bostwick, Omaha, Neb.

Fig. 76. Stockyards in a Corn Belt city. In any one of what cities might it be?

ripen in the shorter summer of the north. For this reason the Corn Belt is creeping steadily north as well as west. Several weeks before it is ripe enough to use as grain, the whole corn plant can be put into a silo (Fig. 55) and kept. How does the silo move the northern limit of the Corn Belt?

78. Agricultural future of the region.—There is no other such grain belt in the entire world. Land does not increase, but population does. Consequently the world wants each year more wheat and meat, and the price of these foods has been rising most of the time since 1900. The Prairie Corn and Small Grain Belt sends these products to nearly every part of the United States which lies to the eastward and southward. Europe and the West Indies also buy them. The high price of produce makes the American farmer able to pay a higher price for his farm. Thus land that was given away in 1860 and 1870 is now worth as much as \$200 or even \$300 an acre. What does it cost to get a 160-acre farm now? What did it cost fifty or sixty years ago? (Sec. 54.)

This region is unlike the Cotton Belt and Florida in that nearly all the land is already in use. To obtain more produce the farming methods are being steadily improved, and crop yields are increasing year by year. But strange to say, the farm population is de-



Fig. 79. Can you explain how this Missouri farmer is getting his wagonload of corn ready for market? Pork from our Prairie States is an important export.

creasing in many sections. One reason for this is that so many new machines have been invented for doing farm work. The most important new farm-machine is the tractor. (Fig. 17.) By means of it and other machines, the farmer can cultivate more acres, and therefore he needs less help. This is one reason why the farm population is declining in numbers. Each year people move from the farms of this region to Canada, to our own western states, and to the cities in many parts of our country.

79. Development of manufacturing.—Thus far the manufacturing has been chiefly preparing meat and cereals for the market, and making machinery, fencing, and farm supplies. Aside from food

or machinery, the leading manufactured article for shipment to other regions is automobile tires, of which Akron is the chief manufacturing center in the United States. Manufacturing in general is increasing, especially in the cities of the eastern part of this region. The coal map (Fig. 44) shows the location of good supplies of coal.

This region is rich in coal and food; it is near to lumber, iron, and cotton



Fig. 78. Partly dressed hogs roll in steady procession by a line of workmen. Each man does his special work on each carcass as it is passing.



Fig. 80. Can you tell how navigable rivers may help the Central Farming Region in the future? Compare with political maps and cities map. (Fig. 314.)

districts. As wool and rubber are light and easy to carry they can readily be imported.

QUESTIONS

1. Complete the following chart:

HOW MOTHER NATURE'S HELPERS AID THE CORN-BELT FARMER.

NAMES OF HELPERS.	WHAT WORK THEY DO.
Soil.....	
Surface.....	
Temperature.....	
Cyclones.....	
Rivers.....	
Glacier.....	

2. Tell why the Corn Belt has become the home for thousands of domestic animals. 3. How were the boundaries—north, south, east, west—for the Corn Belt determined? 4. What do you mean by rotation of crops? Why does the farmer rotate his crops? Tell how a Corn Belt farmer rotates his crops. 5. How many states in this region have coal? (Fig. 44.) In which parts of this region have manufacturing industries the best chance to increase?

6. Suppose your town newspaper has engaged you to hike across country from Akron, Ohio, to Wichita, Kansas. Write the story of your journey through the Corn Belt towns and cities. 7. If a high range of the Rocky Mountains extended eastward to South Carolina just north of the Gulf of Mexico, what would be the climate of the Corn Belt?

8. Corn goes to market "on the hoof." Explain. 9. How do the people in the Corn Belt help to supply your needs? What products does the region in which you live send to them? 10. Might these people be called your neighbors? Why? 11. What is the population of St. Louis? (See Appendix.) of your town? Can you give two good reasons for the difference? 12. Imagine you had taken the pictures found in this chapter, and had wished Dr. Smith to use

them for this geography; what good thing about the Corn Belt would you show him in each picture?

PART II. OHIO VALLEY

80. Location and climate.

—The Ohio Valley region (Fig. 21) has three sides. What regions bound it? The summer is much like that of the neighboring regions,—warm with frequent rains—a good climate for crops. The winter is a mixture of Corn Belt winter and Cotton Belt winter. One day the warm south wind blows up from

the Gulf, and a warm rain falls. The birds sing, the grass begins to grow, and it seems almost like spring. The next day a cold wind rushes in from the north, the ground freezes, and you think you are in Canada, so sudden is the change. Why is this winter weather so very changeable, with its mixture of warm waves and rains, cold waves and snow? (Sec. 70.) The snow rarely lies on the ground very long at a time.

81. Surface.—If the Ohio Valley were as level as the Prairie Corn and Small Grain Belt, it would be a part of it, for corn is also the chief crop of the Ohio Valley. Hills make the chief point of difference between it and its northern neighbor. The surface of nearly all the valley is composed of hills so steep that

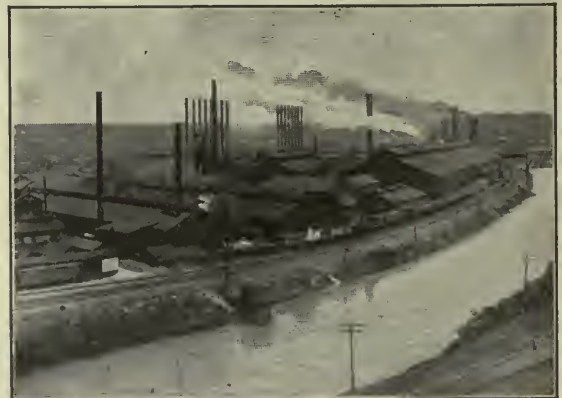


Fig. 81. Plant of the Republic Iron and Steel Co., Youngstown, O. In this section the river has a very flat valley. Why? (Sec. 52.) Railroads can run in all directions.



Courtesy Kentucky Agr. Exp. Station

Fig. 82. Can you see parts of the original surface of this land that have not been cleared, plowed, and gullied? Can you tell why the gully is the worst resource destroyer there is? See Figs. 4, 491, 525.

roads do not run due north and south or east and west, as they do in the Corn Belt; instead they go in the valleys and around the hills where it was easier to build them. The place at the north, where the level land ends and the hills begin, is the place where the glacier stopped (Sec. 52). The hills were carved out by streams running to the Ohio River.

Originally there were a few grassy plains where deer and buffalo pastured, but most of the Ohio Valley was covered with glorious forests. In this region of fertile soils and plentiful rains, walnut, poplar, oak, and pecan trees grow to great size, the trunks sometimes reaching a diameter of six feet, and a height of a hundred feet or even more.

82. Men and hills.—How have men made a living in this hilly country? In many places they cleared the forest, plowed the hill-sides, and planted corn, just as was done in the Corn Belt. Now most things have a good side and a bad side, and this is true with some of our crops, even the very valuable corn and cotton. The summer rain of

the eastern part of the United States is splendidly suited to many crops, but it needs watching. Try this. Go examine school yard, roadside, or plowed field after a heavy rain and see how deep are the little gullies that this one rain has cut as it carried bare earth away. Since our soil is mostly made by the decaying of the rock beneath it and often only one inch of rock decays in many, many years it is easy to see that it is very difficult to plow the hilly land and grow such cultivated crops as corn, tobacco and cotton, without having the soil wash away faster than it is made. In parts of many foreign countries the soil has been all carried away, and in many parts of the United States the hill lands are already much less productive than the level lands. What is the cure? Three things in the Ohio Valley give answer—the sheep and apples mentioned below, and a new tree crop agriculture. (Sec. 87.)

In the upper part of the valley the farmers of Ohio, Pennsylvania, and West Virginia have found a better way to use their hills. Instead of plowing them, they allow thick grass to grow. With its roots it holds the earth in place, and with its tops it pastures many flocks of sheep. This section has prospered and has become famous for its merino sheep, a Spanish breed, producing heavy fleeces of long, fine, soft wool. (Figs. 84, 627.)



Courtesy Ohio Exp. Station

Fig. 83. Rolling hill country of Ohio Valley. Compare with Figs. 2, 4 and 82. Name the states in which these hills may be seen. (Fig. 21.)

In parts of southern Ohio the farmers are now able to grow apples on their hills without gullying and ruining the land. Some years ago a professor in the Ohio Agricultural Experiment Station found some orchards on hills where the land had become so poor that the trees would not grow an inch a year, or produce any fruit. He fed each of the trees with a few handfuls of nitrate of soda, which is a commercial fertilizer, rich in nitrogen. Then the trees fairly jumped, and sent out twigs a foot and a half long the first season. The next year they bore fruit. Now hundreds of acres of these grass-covered hills are dark green in summer with the healthy leaves of well-fed apple trees. In the autumn the trees are heavy with fruit.

83. Limestone plains.—In the midst of the Ohio Valley are two nearly level plains, with land so rich that the districts are famous for agriculture. The rock beneath the soil of these plains is limestone. We saw in the Black Belt of Alabama and the Black Land of Texas, that limestone forms a fertile soil when it decays. These plains, each several thousand square miles in extent, are the Nashville Basin and the Kentucky Blue Grass Region. Nashville is the center of the Nashville Basin; Lexington is the center of the Blue Grass District. If trees are not allowed to shade the ground, the Blue Grass Region becomes covered with a tough, thick turf of a bluish-green grass, which is excellent



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Fig. 85. A Kentucky tobacco farmer hanging up green tobacco to cure in the tobacco shed. Why is Louisville the world's greatest tobacco market? (Fig. 54.)

for pasture. For many years this limestone plain was famous as the place where the finest carriage and race horses in the United States were raised. The automobile has hurt this business; consequently, the beautiful horses are now seen in only a few places, and the rest of the Blue Grass Region raises splendid crops of wheat, corn, tobacco, and hemp. Hemp is a plant from whose big stalk the fibers are taken to make cheap rope.

The limestone plains of Kentucky and Tennessee, and also some of the hilly sections of the Ohio Valley have many thousands of acres of tobacco, making this region the leading tobacco section in the United States, and the city of Louisville the greatest tobacco market in the world. Each year tobacco buyers from many parts of the United States and Europe come here to buy supplies.

Tobacco is a crop needing much labor of the



Courtesy A. C. Bigelow

Fig. 84. Sheep breakfasting on corn fodder in wintertime. In summer these sheep make good use of West Virginia, Pennsylvania, and Ohio hills. (Sec. 82.) In how many ways may corn and grass be sent to market?

kind that boys, girls, and women can do. Many of the boys and girls who help grow tobacco do not go to school very much. The tobacco plant takes so much plant food that it leaves the soil poor. The grower usually waits several years before growing tobacco a second time on the same field, and even then it must be heavily fertilized.

The rocks beneath these two limestone regions, as in other limestone regions, are honeycombed with caves. (Fig. 19.) One of these is the famous Mammoth Cave, in Kentucky, a wonder of nature which many tourists go to see. In this cave people can go boating on the stream that helped to carry away the limestone and make the cave.

84. Flood plains.—Along the Ohio River and its branches in Kentucky, Indiana, and Illinois, wide areas of lowland are covered from time to time by muddy, flood-waters from the overflowing rivers. Then people go about in boats in the woods and fields for miles and miles. These floods sometimes raise the river-level as much as fifty feet at Cincinnati. When the water goes down, it leaves on the flooded land a layer of mud rich enough to fertilize many heavy crops of corn, so that corn is grown there year after year (Sec. 587). Sometimes an occasional summer or autumn flood spoils the crop, but this happens so rarely that these cornlands of the flood-plains are very valuable.



Courtesy Ohio Experiment Station

Fig. 87. Crop from two rows of apple trees ready for market in a southern Ohio hilltop orchard. One row of trees had nitrate of soda. The other had none. (Sec. 82.) Do you think it pays to use fertilizer? Why?

85. Transportation and cities.—No region of the United States, except the plain along the Atlantic Coast, has rivers so well placed for good boat service. Make a sketch map of this district, marking the navigable rivers (Fig. 80) with double lines. The Ohio has been an important highway since the days of the first settlement of the country west of the Appalachians. Kentucky was the first state west of the mountains, and the first large settlements there were close to the Ohio, because its waters were the great highway. All the trade that the settlers had was by means of the flatboats that took produce down the Ohio, but which could not be brought back again (Sec. 9).

Much work has been done to remove rocks and deepen the channel, and many steamboats and barges now carry freight up and down the Ohio very cheaply. Cincinnati and Louisville, the great cities of the Ohio Valley Region, are on the banks of this stream. Both have a large wholesale trade with the small towns and the country stores, and each also has many factories, meat-packing plants, machine shops, and iron works.



Courtesy Cincinnati Chamber of Commerce

Fig. 86. Part of the University of Cincinnati. What do the distant smokestacks tell you?

Cincinnati has also fine potteries and tanneries. The other cities of the Ohio Valley Region are smaller than the two great river ports. Nashville is the capital of Tennessee; Lexington is a horse market; and Evansville is a great market for hardwood lumber, some of which is brought on rafts and steamboats from the forested hills of Kentucky and from the Appalachian Plateau. Wheeling, Parkersburg, and Huntington, West Virginia, in the upper part of this district, are among the many towns which manufacture iron, steel, and glass. The coal mines of southeastern Ohio, and West Virginia, and natural gas help the growth of manufacturing in this section.

86. Resources for manufacturing.—The Ohio Valley has great resources for manufacturing. Coal is at hand in West Virginia, Pennsylvania, Ohio, and Tennessee. Another coalfield underlies a part of Kentucky and Indiana (Fig. 44). Explain how its location between the North and the South gives it an unusual food supply. Look at the map of navigable rivers (Fig. 80) and explain how it has unusual transport advantage for an inland region. Cotton, wood, iron, food, and power are at hand. What will result from the building of a canal from the Ohio to Lake Erie as is now planned?

87. A possible new agriculture.—One of man's great discoveries is the art of grafting and budding trees. By this means a million bitter-fruited thorny orange trees have been given thornless and sweet-fruited tops like the one original seedless navel orange tree from which they all came. The same thing has been done with the Baldwin apple and many other fruits. After centuries of failure, men have recently learned how to graft the nut trees. We can now make groves and orchards like these rare best trees. The people of California have developed many kinds of fruit and nut trees which were never known to the North American Indians, or to the early settlers. Now a large part of the state is devoted to growing these new products, and the state is famous for its wonderful wealth from these sources. The Ohio Valley offers us a rich start for a new

tree-crop agriculture. It has wild hickories and pecans whose kernels come out in whole halves, walnuts whose meats come out in whole quarters.

In this Ohio Valley, wild persimmons, hickory nuts, acorns, and walnuts have fed many hogs since white men came. These wild products, called "mast", fed many wild animals in the time of the Indians and before. Nature invites man to take these trees, improve them (Sec. 51), and use them as a start in a rich, new tree-crop agriculture which will hold the soil (Sec. 82), make food for animals and food for men, and finally will yield valuable wood and logs.

Experiments here and there show that this kind of tree farming may be very productive. (Secs. 455, 559, 560.) If we keep on with our schools and our scientific agriculture, the American hills should surely have grassy slopes covered with orchards of apple, walnut, hickory, oak, persimmon, cherry, mulberry, honey locust, and other fruiting trees. The cherries can be dried and canned. The mulberries will be eaten eagerly by pigs and chickens; the acorns by the pigs and sheep. Cattle will eat honey-locust beans instead of corn. The persimmon has long been a very important source of food in China, and is already to be found in American markets. Many other kinds of trees now unused, in this country and in other countries, may be made profitably fruitful if given the same degree of scientific care as has been given to change the apple, the orange, and the walnut from unpromising wild trees to the splendid varieties we now have.

These trees can grow on pastured hills, while the level lands in valley, on hilltop, or terraced slope (Fig. 525) can have an intensive agriculture yielding corn, oats, hay, garden vegetables, and and other crops for which the earth must be plowed.

QUESTIONS

1. What is the chief difference between the Ohio Valley and the Corn Belt? Give a reason for this difference. In which would you prefer to live? Why? 2. How are the boundaries—west, east, north, south—determined? 3. Where might a fac-

tory in the eastern part of the Ohio Valley buy coal? iron? How could they be shipped? 4. Complete the following chart for the important cities of the Ohio Valley:

NAME OF CITY.	LOCATION.	WHAT I SHOULD REMEMBER ABOUT THIS CITY.

5. Tell why the winter weather and the surface of the land make gullies worse in Tennessee than in Iowa.

6. How did the Ohio River and its tributaries aid in the early exploration and settlement of our country? Explain their value to-day. 7. Of what benefit would it be to this region for the schools to organize apple clubs? 8. As a member of the United States Department of Agriculture, compose a letter addressed to the farmers in the Ohio Valley, suggesting means to increase the production and value of their farms.

9. Compare the fertility of the soil in that part of the Ohio Valley that can grow corn year after year, with that in Florida. Explain the difference.

THE NORTHERN WHEAT REGION

88. General view.—If we should take an automobile journey late in July and travel northwestward through southern Minnesota, we should notice that in the course of the day's journey there are fewer and fewer fields of tall, tasseled corn and more and more fields of wheat. This would mean that we were crossing one of those lines of gradual change along which *climate* causes crops to change. We would be leaving the Corn Belt and entering the Northern Wheat Region, where the summer is too cool and too short for



Finch and Baker, U. S. Dept. Agr.

Fig. 90. Oat acreage of the United States and Canada. Compare this with the wheat maps. (Figs. 72, 93.)

corn. We could ride on for days and days, and go several hundred miles across a wide, level, treeless plain, and every day, at almost every hour of the day, we should see scattered farm houses and fields of wheat and oats. This section is called the Northern Wheat Region because here wheat is the chief thing the farmer has to sell. Wheat is as important to him as cotton is to the farmer of the Cotton Belt.

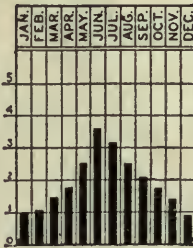
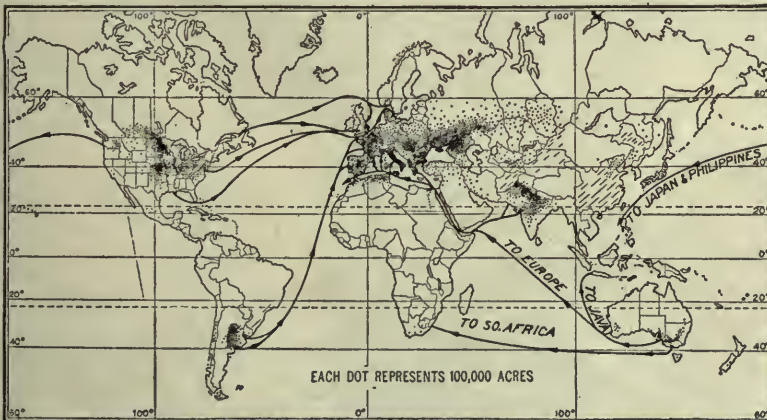


Fig. 89. Rainfall of Winnipeg, Canada, 21.7 inches per year. Can you explain how this rainfall suits spring wheat?

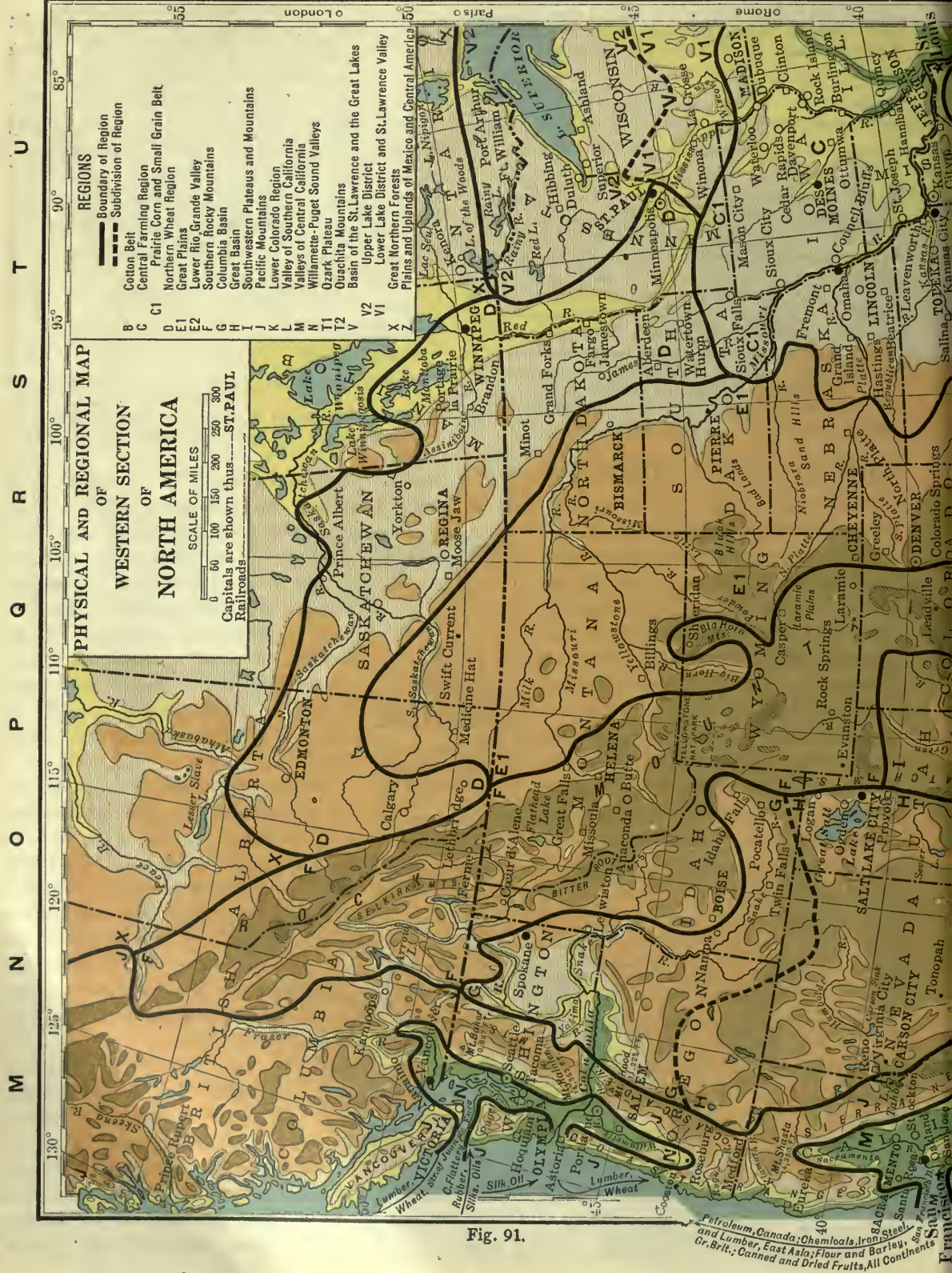
We should notice also that here the wheat was still green at a season when, a short distance away in Iowa and Nebraska, wheat was being threshed. What is the reason for this difference? Climate gives the answer. When is wheat sown in the Prairie Corn and Small Grain Belt? (Sec. 74.)

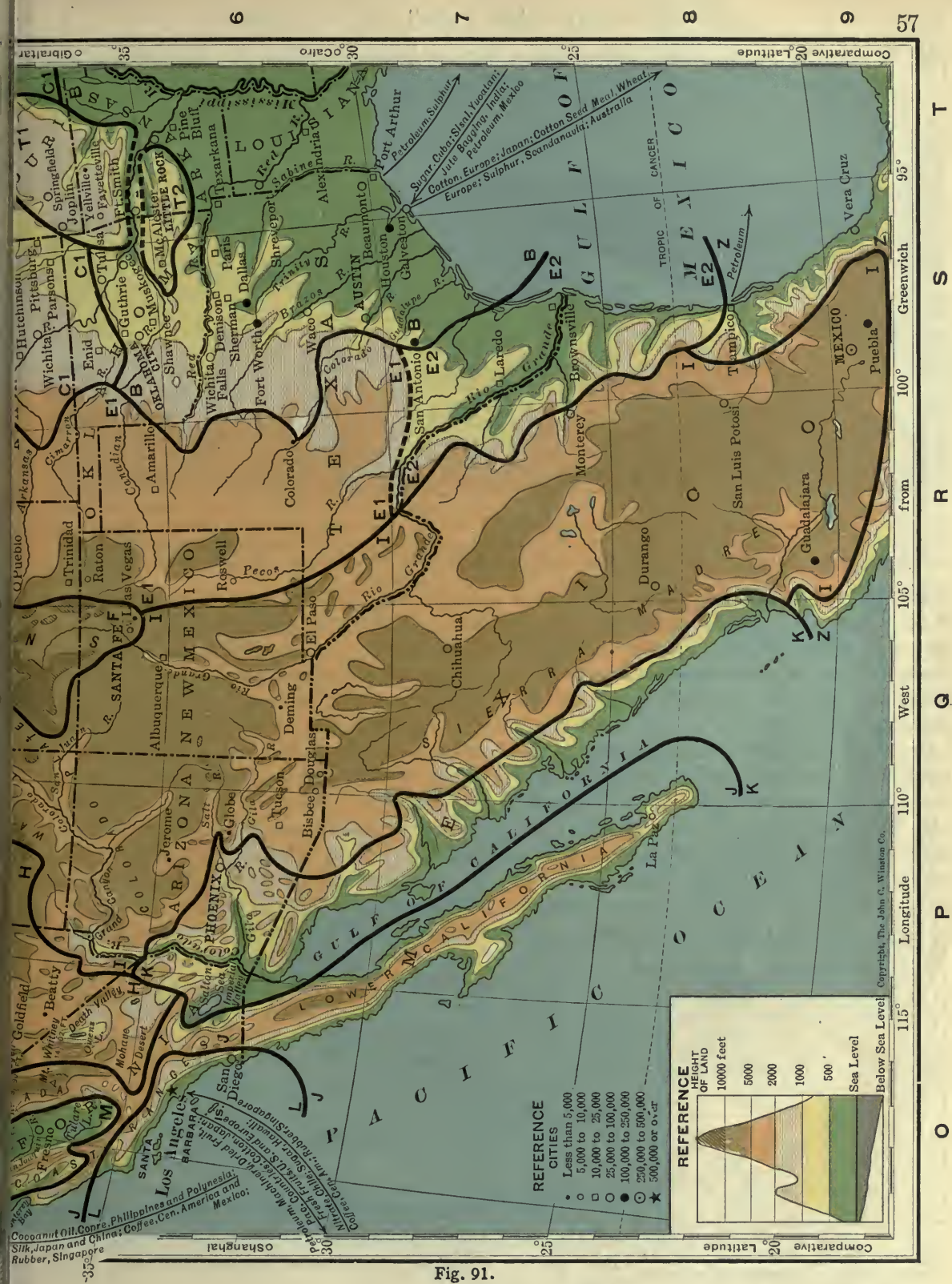
89. The spring wheat climate.—In the Northern Wheat Region the winter is so cold and dry that winter wheat, which is sown in the fall (Sec. 74), does not live well there. Therefore varieties called spring

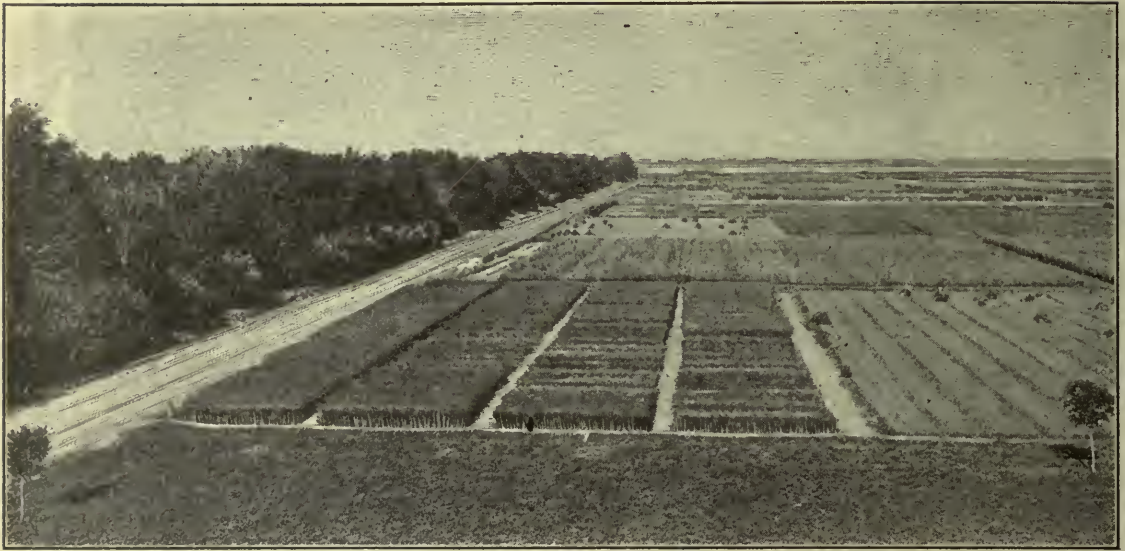


Finch and Baker, U. S. Dept. Agr.

Fig. 88. The world's wheat acreage. We have so few statistics from China and Afghanistan that we can only show the region by slanting lines.







Courtesy North Dakota Experiment Station

Fig. 92. Experiment plats at the North Dakota Experiment Station. There are several hundred such experiment stations in the world. What good do they do? The trees were planted to make a windbreak on the very flat plain. Farmers on the plains often plant such windbreaks. Will this land wash away as hilly land does? (Fig. 82.)

wheat are grown. The rainfall of the Northern Wheat Region is in most years wonderfully suited to spring wheat. During the spring thaw, the soil is moist enough to be plowed easily, and there are few rains to disturb the planting, which is done in April and May; hence the name, spring wheat. Most of the rainfall of the year comes within a few months after the wheat is planted (Fig. 89) and the wheat plants grow like tall, thick grass. Wheat and all the other grain plants are just big grasses. In late summer the rains grow less at the very time when the wheat

needs the sunshine and dry weather to ripen it.

90. Surface and soil.—The best part of this Northern Wheat Region is the Red River Valley of

the North, comprising part of Minnesota, part of North Dakota, and a large area in Manitoba. As the glacier (Fig. 53) that once covered northern North America slowly melted away, it stood as a dam across this valley. What is now the Red River Valley was then a very large lake of muddy glacial water, which had an outlet over the divide into the Minnesota River (Fig. 54). When the glacier finally melted, the water of this lake flowed into Hudson Bay, leaving the old lake bed a plain so flat that often you can not guess which way its waters will flow. The soil is rich and as soft and fine as meal, for it is made of the mud that settled on the bottom of the lake. There are no forests on most of this land. There is no better place in the whole world to use farm machines, for there is not a stick, stone, stump, root, or hill to interfere with their work.

Northwestward from this wide, flat valley, the wheat region extends on over tens of thousands of square miles of other good land very much like that of the Prairie Corn and Small Grain Belt. The region yields large crops of wheat, oats, barley, rye, and flaxseed.



Finch and Baker, U. S. Dept. Agr.

Fig. 93. Spring wheat acreage of the United States. Compare this with the winter wheat map. (Fig. 72.)

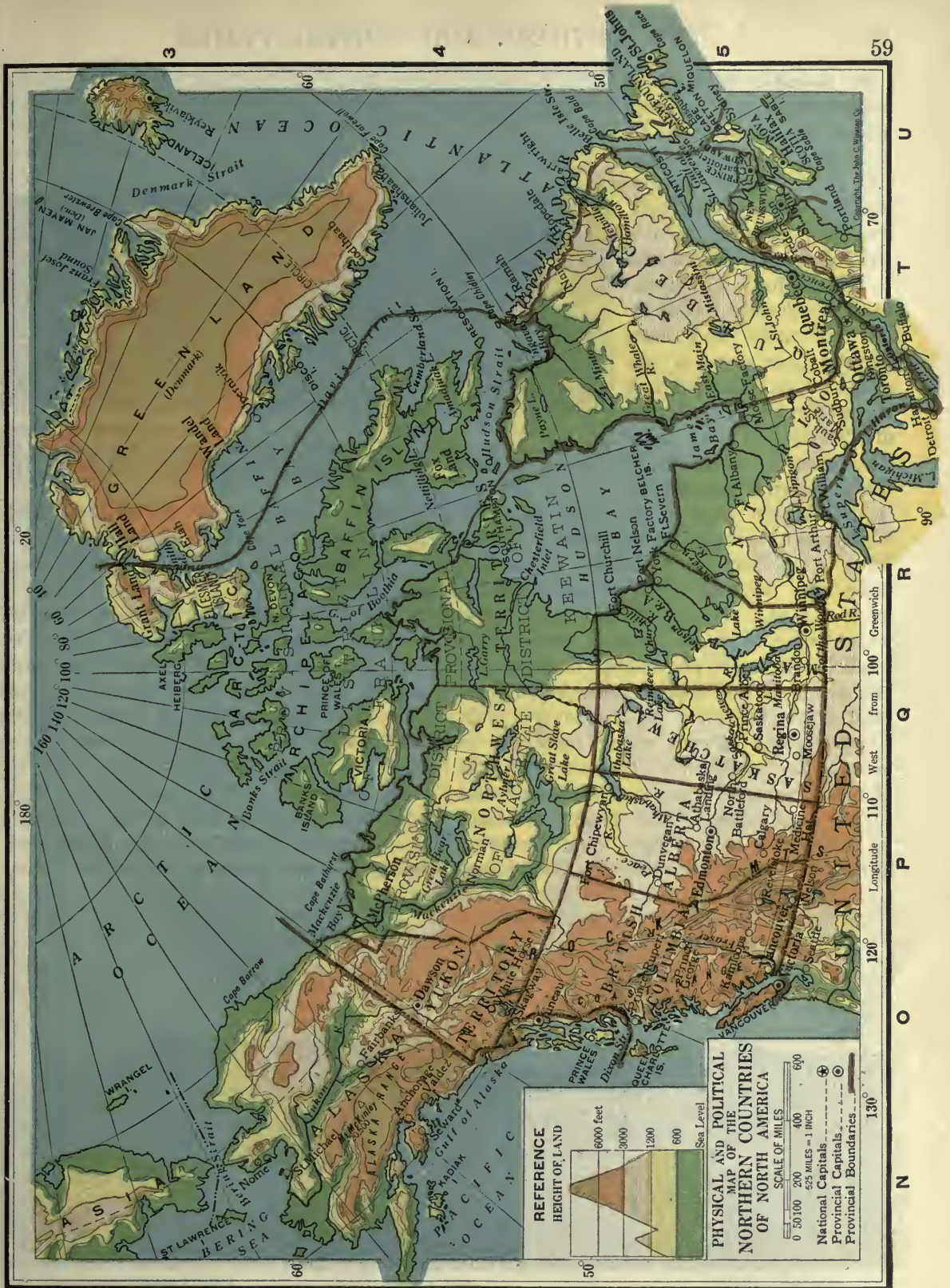


Fig. 94.

91. **Bounds.**—Most of the boundaries of the Northern Wheat Region are made by climate. We do not know just where they are, because weather is always uncertain, and men have not been in the Northwest long enough to become fully acquainted with the climate. Men are learning more and more about raising crops in new countries, so that land once thought to be useless is now divided up into good farms. The eastern boundary of the Northern Wheat Region

is the eastern edge of the plain and the beginning of a rough, rocky country. (Sec. 333.) The northern boundary is the line where the summer becomes too short for grain to ripen. In the northern part of the wheat belt the grassy plain is dotted with small ponds, lakes, and clumps of trees. As you go north, the trees increase in number, until finally the whole plain is covered with a forest that extends many hundreds of miles to the northward. The southern part of this forest may some day be cleared and turned into farms, if the climate is found to be suitable, and if more room for farms is needed. Here and there in a forest clear-



Courtesy International Harvester Co.

Fig. 95. A hay rake and hay wagon in South Dakota. How many of the workers in this picture might be replaced by the tractor seen in Fig. 73?

ing as far north as 60° N. latitude, some fur trader raises a little field of wheat.

The western boundary is made in part by a wall of mountains, the easterly range of the Rockies. Through southern Alberta, southern Saskatchewan, western North Dakota, and western South Dakota the boundary is made by another climate line, the place where the summers are so often too dry for a good crop of wheat that the farmers rarely try to grow it there.

92. **Free land.**—This vast northern plain is the only remaining place in North America where settlers can still go and have good, productive land given to them for *nothing*.



Photo. Publishers' Photo Service, N. Y.

Fig. 96. A frontiersman's sod house and barn in Saskatchewan. No other cheap prairie house is so warm. Why?

In the last half of the nineteenth century land was being given away in the upper Mississippi and Missouri Valleys. (Sec. 54.) Then the railroads were extended northward, and the rush to the new frontier carried settlers through Dakota and Minnesota into Manitoba. New railroads are now being built northward across the plains of Saskatchewan and Alberta, where empty land still awaits the coming of the settler.

93. **The settler's life on the prairies.**—When the new settler goes to live on the 160 acres of land given to him by the Canadian government, he finds that in June his land is a level expanse of green grass, dotted with bright flowers. If the settler wants to save money and yet build a house quickly, he may make a house of sod and buy only the windows and doors. The plow turns over a strip of prairie sod three or four inches thick and a foot wide. It is not much work to chop the sod strip into lengths with a spade and then to build the house. Even the roof is sometimes made of sods, which are placed upon poles brought from the banks of a stream or lake, or hauled by wagon from the railroad station perhaps twenty miles away. The "soddie" (Fig. 96)



Courtesy U. S. Dept. Agr.

Fig. 97. A head of oats.

of the new settler is the cheapest warm house of the plains.

The settler needs only a small barn to shelter his team, tools, and cow, because for a few years he will grow only wheat or flaxseed. After the grain has been threshed, it can be covered up with straw for a few days or weeks, until it can be hauled to the grain elevator at the railroad station.

Frost comes early in September, and, in the northern part of the region, the ground freezes hard in October, so the winter is long and lonely. Every few days, for many weeks, the thermometer is from twenty to forty degrees below zero. The bitter cold blizzard winds sweep with fury across the treeless plain.

94. **The chinook wind.**—If the settler lives near the foot of the Rockies, he has from time to time in the winter a queer warm wind, called the chinook. It blows down the eastern side of the mountains. In the evening the ground is covered with snow; in the morning the snow is melted and gone. Because of the chinook, the western part of the Canadian plains has warm days in winter and less snow cover than has the eastern part.

95. **Grain and dairy farming.**—Wheat is



Courtesy Experimental Farm, Ottawa, Canada

Fig. 98. Plowing the flat plains of southern Saskatchewan. Tractors often have twenty to forty horse power.



Courtesy Dept. of Immigration and Colonization, Ottawa, Canada
Fig. 99. Selling cattle in a stockyard, Western Canada.

the chief crop, because it is the most valuable grain that will grow in the region; but oats, barley, and rye are also grown, for they do not have to be harvested at the same time as the wheat. On many of the wheat farms there is a herd of dairy cows. Cattle-keeping in this region differs from that in the southern part of the Prairie Corn and Small Grain Belt. The winter is shorter in the corn districts, and there cattle can find their own living for a longer time than in the north. Since animals must be fed in barns from September to May, farmers in the Northern Wheat Region must have animals that give great returns. The cow with her milk yields more return than an animal which is kept and fed for two or three years and is then sold for meat only. The farmer has time to milk cows in the winter; so milk, butter, and cheese are more important to the people in the new country of the Northern Wheat Region than to those in the longer-settled regions of Kansas, Nebraska, and Missouri.

96. The potato.—The short, cool, damp summers and the soft, mealy soil of this region exactly suit the potato plant. There is probably no place in the world where potatoes can be grown more easily. Before the World War they were grown in the Red River Valley at a cost of twenty-five cents a bushel. The potato, however, is so heavy and so easily spoiled by freezing that in

cold countries it cannot be shipped for great distances. For these reasons the people of the eastern cities get their supply of potatoes from nearer home. North America could easily grow forty times as many potatoes as it does, but we do not need them yet. As a result, much potato land of the north and west is unused.

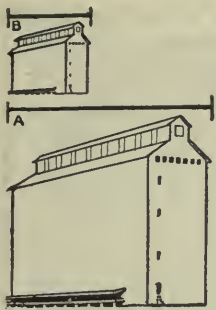
97. Government aid.—The Canadian states are called provinces. Their governments do many things to help the citizens

with business affairs. They help farmers to buy good, pure seed, and cattle of good breeding. In some cases government creameries are run to help farmers sell their milk. There are many agricultural colleges and schools, and men in experiment stations are teaching the people better ways of farming.

98. Transportation and cities.—The early settlers near the Atlantic coast could market some of their produce by water, but the Northern Wheat Belt is so far from the coast that it had to remain unsettled, the roaming ground of the buffalo and the hunting ground of the Indian, until the railroads came. The railroad brought the wheat-grower to the new land, and now on every autumn day tens of thousands of farmers' wagons haul wheat from threshing machines



Courtesy Dept. of Immigration and Colonization, Ottawa, Canada
Fig. 100. School children with their banners at an agricultural fair in Alberta.

Fig. 101. Wheat production, 1918-19:
(Average bushels)

B. Northern Wheat Region

Minnesota.....	56,053,500
North Dakota.....	80,436,000
South Dakota.....	46,167,500
Manitoba (Canada).....	45,698,500
Saskatchewan.....	95,213,000
Alberta.....	24,941,500

348,510,000

A. All the rest of the United States

and Canada.....	775,420,000
-----------------	-------------

to railroad stations. Freight trains are laboring southeastward toward Minneapolis and Lake Superior with millions of bushels of wheat, most of which goes to Europe by way of lake boats from Duluth, Minnesota, and from Port Arthur and Fort William, Ontario.

The grain reaches the steamboats late in the season, and only about one-fifth of it can be taken down to Buffalo and Montreal before the lakes freeze over for the winter. The rest of the grain of that season is stored, and comes down to the Atlantic ports the next spring. Most of the wheat grown in the American part of this region goes to Minneapolis to be ground into flour, and to Duluth for shipment to our eastern cities.

We do not expect to find many cities in a region so far from the sea and so recently settled as is the Northern Wheat Belt. The cities are chiefly trading cities, busy supplying the farmers, and forwarding the grain that comes to them from the country railroad stations. The cities are all small except three: Minneapolis, St. Paul, and Winnipeg.

99. The wheat cities.—Minneapolis and St. Paul, "The Twin Cities," have become the metropolis of the part of this region which lies in the United States. There are two reasons for this: (1) The head of navigation on the Mississippi makes a natural trade center for a wide region; (2) water-wheels driven by the Falls of St. Anthony have made Minneapolis the great flour-milling center. Have you seen an advertisement of Minneapolis flour?

Winnipeg is the metropolis of the Canadian part of this district. It is located on the Red River, and steamboats bring it grain from the south. It has the best location of any city in western Canada. Like Chicago, Winnipeg is a railroad center, and you cannot travel west by train without passing through it. Look at Fig. 308, and tell why the railroads from west to east draw in at Chicago like the rays of a fan. For how great a distance do Lake Winnipeg and Lake Winnipegosis block railroads from going east? (Fig. 91.) How long is Lake Michigan? (Fig. 309.)

100. Future agriculture.—As the population of America grows larger and larger, this region may become one of the three greatest sources of food supply.

The other great food sources are the Central Farming Region and the Cotton Belt. Bread, butter, cheese, meat, potatoes, and beets can be produced in the Wheat Region in great quantities. There farm machinery can help greatly: the tractor can do wonders on such

level land. Thus the farmer there may some day divide his farmland into six fields, raising crops in regular order somewhat as follows: (1) wheat, to send away to distant cities; (2) oats; (3) barley; (4) hay for his own horses and cows; (5) pasture for his cows. The

sixth field could be one-half in beets for the cows, and one-half in potatoes for men. The 160-acre farm of this region might then yield the following products each favorable year: wheat, 25 acres, 25 bushels per acre; potatoes, 12½ acres, 200 bushels per acre; milk, 30 cows, 3500 quarts per cow. European lands are made to yield as much and

Fig. 103. Five leading wheat-producing states in the United States, 1919-20:

(Bushels)

A. Kansas.....	144,560,000
B. North Dakota.....	61,800,000
C. Nebraska.....	60,570,000
D. Illinois.....	52,610,000
E. Oklahoma.....	50,140,000

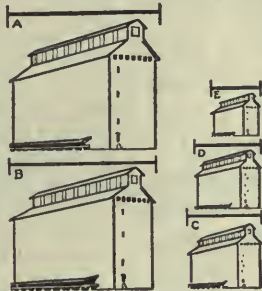
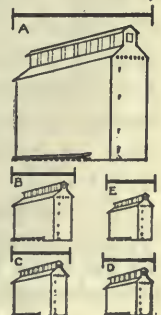


Fig. 102. The leading wheat-producing nations, 1912-13:

A. United States.....	746,820,000
B. European Russia.....	731,260,000
C. British India.....	366,600,000
D. France.....	328,640,000
E. Austria-Hungary.....	244,770,000





Courtesy Winnipeg Board of Trade

Fig. 104. Portage Avenue, Winnipeg. Locate the city. (Fig. 94). Why may it be referred to as the "Chicago of Canada"?

more in the regions where intensive agriculture is employed. This system is much like that in parts of Europe. It is a good example of intensive agriculture, because the land produces many crops and large yields.

Compare the population per square mile in Poland, Czechoslovakia, and the Canadian provinces.

We do not at present need such great quantities either of dairy produce or of potatoes; but if the price of gasoline should go much higher, we may have to use alcohol to run motorcars. If that time comes, the Northern Wheat Belt farmer may spend the winter hauling loads of frozen potatoes to the alcohol distilleries.

101. Manufacture.—At present there is but little manufacturing in this region, although thousands of square miles of this land are underlaid with coal. Its quality is rather poor, but it could easily be made to furnish power for many large manufacturing cities.

QUESTIONS

1. Account for the fertility of the soil in the Wheat Belt. Of what advantage is its levelness?

2. How have the Great Lakes helped this region?
3. Make the following comparisons:
How I distinguish between different regions.

TOPIC.	COTTON BELT.	CORN BELT.	NORTHERN WHEAT BELT.
Location.....			
States in region...			
Temperature:			
(a) Jan.(Fig.328)			
(b) July(Fig.329)			
Rainfall (Fig. 158).			
Products:			
(a) mineral.....			
(b) agricultural.			
(c) grazing.....			
(d) forests.....			
Chief cities.....			

4. Why have the "Twin Cities" become the metropolis of the American portion of this region? Winnipeg, of the Canadian section? 5. Can you find out how alcohol may be made from potatoes? To what interesting use may this fuel be put? 6. Port Nelson and Boston are the same distance from Liverpool. Canadians hope to ship grain to Europe by Hudson Bay ports. (Fig. 94.) How will this influence Winnipeg, Montreal, the Canadian farmer, and the English consumer?

7. Does butter require more labor to produce than beef? Why? Which costs more per pound? Which of these products belongs to intensive agriculture?

THE GREAT PLAINS AND LOWER RIO GRANDE REGION

PART I.—THE GREAT PLAINS

102. The ranch and the plain.—What regions bound the Great Plains? (Fig. 91.) In



© Minneapolis Civic and Commerce Assn.

Fig. 105. Falls of the Mississippi at Minneapolis, the center of the world's largest flour-mill district. What advantages bring these mills to Minneapolis?



Fig. 106.



Fig. 107. Cattle by a water-tank on the high plains of Texas. What does the windmill do?

Courtesy Amarillo, Texas, Board of Trade

this vast region one may often see only wide plains without a house or a crop or a tree. Here and there a wire fence runs in a straight line to such a great distance that one can not see the end of it. A man on horseback comes riding along beside the fence. He wears a broad-brimmed hat and leggings, and on his hands are gauntlets. Tied to his saddle are a coil of wire, a hammer, a bag of staples, and a pair of pinchers. He is a ranchman, riding around his fences to see if they need to be mended. His ranch covers four square miles, but it has only about 160 cattle on it. His house is down in a little valley protected from the wind. A well has been dug and a windmill pumps water. Every day the cattle come to drink, and then go back again to pick their living on the distant pasture. The ranch is sometimes divided into three fields:



Finch & Baker, U. S. Dept. Agr.

Fig. 108. Alfalfa acreage in the United States. Can you trace some rivers by the strings of alfalfa land?

hay, and used to feed the cattle when snow covers the range.

Why does it take so large a farm to support one family? (Fig. 158.) Why is the plain treeless from Canada to Mexico, except

near the streams and in the Black Hills? (Sec. 109.) The grass grows in bunches, rather than in a thick turf as it does in the



Finch & Baker, U. S. Dept. Agr.

Fig. 109. Map showing how Kafir corn, a new crop from a dry foreign land, is helping American farmers in lands of light rain. (Sec. 108.)

Corn Belt and on the Ohio Valley hills, and is commonly called "bunch grass."

103. Indians and buffaloes.—White men have not been long in this region. In 1869 came the first transcontinental railroad, from Omaha to San Francisco, built over wide plains and high mountains by the aid of the United States Government. (Fig. 309.) At that time the Great Plains were almost entirely without white settlers. Roving bands of Indians, living in buffalo-skin tents, camped here and there, hunting deer, antelope, and buffalo, millions of which made their home



Photo. Wm. Thompson

Fig. 110. Buffalo at home on the plains of Alberta. How are the animals protected from cold winds?

on these pastures. Like birds, the buffaloes migrated south in autumn, and north in spring.

No one knows for how many thousands and thousands of years these animals had traveled up and down the plains before the white man, the great destroyer of nature,

made a sudden change in things. At first vast herds of buffalo sometimes stopped the trains on the new railroad; but the repeating rifle had just been invented, and in a short time the hunter, the cowboy, and the farmer had slaughtered so many buffaloes that they were almost extinct. There still remains

one small, wild herd, numbering about 300, which ran away into the forested country around Great Slave Lake in Canada, beyond the country of the white man, and away from the repeating rifle. The only other buffaloes left are those protected by men and kept like cattle in zoological gardens, private parks, and government preserves. There is a large preserve in Canada, and one in Yellowstone Park, Wyoming. The buffaloes are now increasing, and may some day become again the beef cattle of the plains.

104. Surface and streams.—Much of the

surface of the plains is so level that it seems absolutely flat, yet careful surveys show that it slopes up toward the Rocky Mountains a few feet in every mile. The eastern edge of the plain is about 2000 feet in height. At the base of the Rockies it is from 5000 to 6000 feet high. At places in the plain, layers of nearly level stone come to the surface, making long lines of hills, or breaks like huge steps, with the plain several hundred feet higher to the west of the step than it is to the east (Fig. 123).

In parts of the Dakotas and Montana are thousands of square miles, areas larger than New Jersey or Maryland, where the land consists of rolling hills with clay soil. In western Nebraska is another large area with hills of sand called the "Sand Hills." Good grass grows there on the sandy soil. Near the corner of Nebraska and South Dakota is another kind of country called the "Bad Lands," the soil of which is hard clay. Much of it is entirely bare, because most of the falling water runs off quickly before plants can get it.

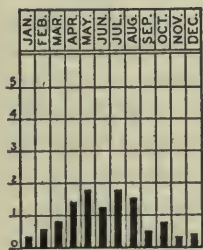


Fig. 111. Rainfall of Pueblo, Colo., 12.52 inches per year. This is the Great Plains type.



Fig. 112. Beet sugar (tons). Five leading states (1918-19):

A. Colorado	190,000
B. Michigan	130,000
C. California	120,000
D. Utah	110,000
E. Nebraska	60,000



Fig. 113. The Bad Lands of South Dakota (Sec. 104). Why was this once a hiding place for cattle thieves?

Because the Bad Lands are without grass, the rain has cut their surface into thousands and thousands of little gulleys. In some of the hollows between the hills, however, a little soil gathers, and in such places enough pasture can be found to support a few cattle.

There are not many streams in such a level land of little rain. A few rivers, fed by the snows of the Rocky Mountains, flow across the plain. In the north, where the mountains are higher and there is more snow, these streams are larger than in the south. The Missouri and South Saskatchewan are the largest streams of this great region. How much of the Missouri is navigable? (Fig. 80.)

105. Cattle raising.—Some early settlers of the plains tried to grow wheat and corn, as they had done in the Corn Belt. On account of the small rainfall, the crops failed and cattle and sheep raising were tried. These have proved successful.

The bunch grass stands on the plains all winter, and is as good for the animals as is the hay in the barn, if only there is enough of it. There is so little snow that the grass is rarely covered up for long; and the cattle, like the buffalo, antelope, and deer, used to pick their own living on the plains. Much of the land still belongs to the Government, because the Government

does not give it away in tracts large enough for a ranch.

Many large bands of sheep roam over the eastern parts of Wyoming and Montana, and the cattle-men sometimes fight the sheep-men, because the sheep not only eat the grass so closely that none is left for the cattle, but their feet also give out an oil that is so distasteful to the cattle that they will not eat even good grass after sheep have walked over it.

106. Irrigation water.—It is easy to irrigate the plains where the streams bring water from the mountains. In a short time after the region was settled, all the water that flowed in such rivers as the Arkansas and the Platte, was used up near the foot of the mountains, and long stretches of good land lay dry, begging for water.

The United States Government now helps with irrigation work by building large dams across the streams back in the mountains. The part of the valley above the dam fills up and becomes a lake or reservoir. Thus enough water is held to irrigate thousands of farms on the Great Plains; these farms then produce crops without rain. (See Figs. 115, 140.) The Canadian Government does the same thing. It has built large irrigation works on the South Saskatchewan like those that our Government has made on the Missouri, the Big Horn, the Platte, the Yellowstone, and other streams. In Montana, the Missouri River in some places flows through a deep valley, which is so narrow that there is but little land over which the water can be made to flow. But there is coal beside the stream. This is used to run engines that pump water up to the fields on the level plain back of the high banks.



Fig. 114. Cross section from east to west through the Black Hills. It shows how underlying rocks pushed and bent upward the level rock layers of the Great Plains which were afterwards worn away by rains and streams. BB is a layer of limestone. In what part of this section is it the surface rock? Water falling on A soaks into the ground and runs under the tight layer D, and will flow out of wells (C) if their outlet is lower than the surface at A. South Dakota has many artesian wells fed by Black Hills water. There are flowing wells on the New Jersey coast, in Australia, and in many other places.

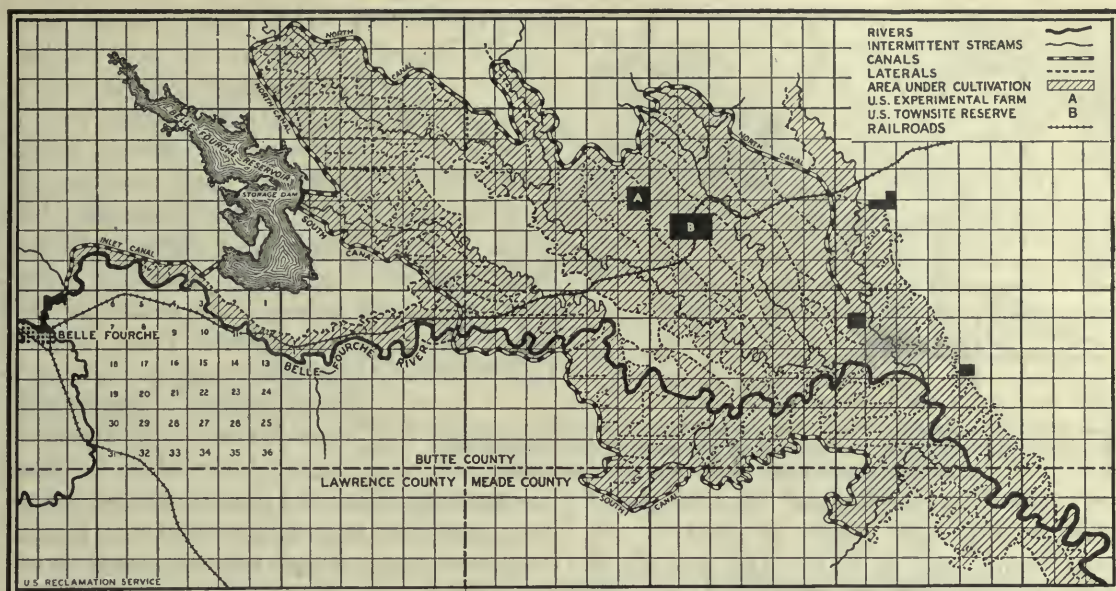


Fig. 115. An irrigation project in South Dakota. Water is carried from a river to a reservoir in another valley. Why does the North Canal wind around so much? Why is there uncultivated land in the midst of the irrigated area? The straight lines are land-survey lines one mile apart. Each square represents a section (a square mile), 36 of which make a township. One township is shown with each section numbered as on the Government maps.

107. Irrigated crops.—Alfalfa, the chief crop grown on the irrigated land of all this region, makes the best of hay. In winter, or in seasons of drought when pasture fails, sheep, cattle, and horses come in from the pastures on the dry plains and are fed from the alfalfa stacks. The farmer grows alfalfa, but he sells cattle, sheep, and horses. These are the chief products of the Plains. It is fortunate that the irrigated land is scattered in many rich valleys, so that the alfalfa stacks can be close to the ranges where the sheep and cattle eat grass to get a part of their living. (Sec. 105.)

In the valley of the Arkansas River, in eastern Colorado, is a trucking district from which, in summer, the famous Rocky Ford cantaloups are sent by hundreds of carloads to eastern markets. In some of the other irrigation districts many potatoes are grown, but they are so far from the market (Sec. 96) that sometimes the pigs have to eat the potatoes. Sugar beets, which are also grown, furnish pulp for cows and sugar for men. Beets are easier to market than potatoes.

108. Dry farming.—Since the failure of the first farmers who came to the Great

Plains (Sec. 105), there has been much study to find new crops or new methods by which farmers could succeed on this wide land of little rain. One of the new ways is to plow a field and let it lie bare for a year, so that there are no plants in it to use the moisture. The next year a crop is sown. It receives the rain of that year, and uses also some of the rainwater remaining in the ground from the year before. By this "summer fallow-



Fig. 116. A bucking horse trying to throw his cowboy rider. Note leather chaps (leggings) tanned with the hair on.

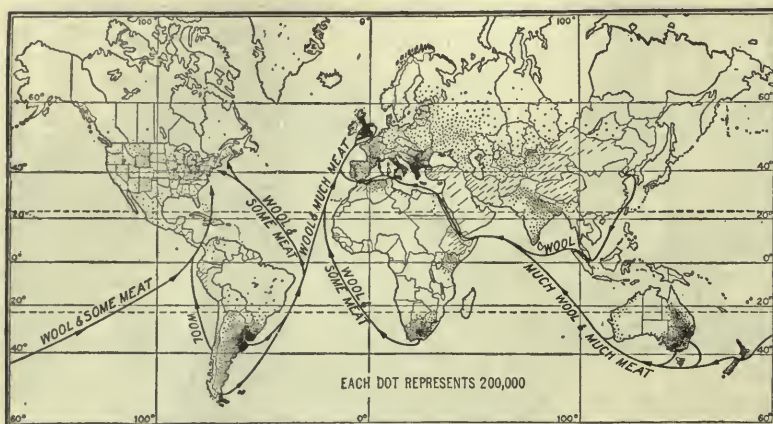
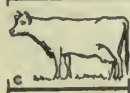


Fig. 117. Map showing where most of the world's sheep are grown. Note the leading ocean trade routes and their products.

ing," one of the methods of "dry farming," some grain is now grown in parts of the Great Plains, and in many other regions of little rain (Sec. 133, Fig. 461).

Another way to make this region more useful is to find new crops suited to dry land. Plant explorers sent out by the United States Government have found in the dry parts of China a cousin of the corn plant called sorghum, and in dry South Africa they found another cousin called Kafir corn. (Fig. 109.) Both of these grains make crops in seasons in which the corn of Illinois would fail because of drought. The crops are not often sent to market but are used for feeding farm animals where the crops are grown. New drought-resistant kinds of winter wheat are being grown in western Kansas and Nebraska, in eastern Colorado and Wyoming, and northern Texas.

109. The Black Hills.—The rock layers of the Great Plains are usually flat except in the Black Hills. (Fig. 114.)



These mountains are forest covered and have many rich gold and silver mines.

Fig. 118. The five leading cattle-raising states in the United States, 1919-20. Milch cows and cattle. (Number)

A. Texas...	5,480,000
B. Iowa...	4,360,000
C. Nebraska	3,490,000
D. Kansas..	3,230,000
E. Missouri	2,680,000

110. Cities.—Would you expect to find many cities, or any large cities in such a region? The largest city is Denver, a great trade center. The location of the city is beautiful because the Rocky Mountains tower above it. A few miles to the south, at the foot of Pike's Peak, is Colorado Springs, a famous health resort. Denver and Pueblo stand on the western edge of the plain. They

are gateways from the plains into the mountains, and from the mountains into the plains.

These cities draw support from both mountains and plains. They have many smelters, which melt ores from many mountain mines, and they have stores which keep supplies for the mining towns in the mountains as well as for the ranches and farms of the plains. The other towns of the Great Plains are much smaller, supported by railroad repair shops on the several lines that cross the plains, and by stores which often supply people living many miles away.

111. Coal.—In several places coal is found beneath this plain. (Fig. 44.) The quality is not as good as that of the coal of Pennsylvania and Ohio, but the quantity is abundant. If France had all the coal of the Great Plains, she would be richer in coal than all the rest of Europe combined. Will this coal make manufacturing cities in the Great Plains?

112. Population.—This large region, which is from 300 to 400 miles wide and 1500 miles long, is larger than England, France, and Germany combined, but it now has fewer people than Chicago or Philadelphia.



Fig. 119. The five leading sheep-raising states, 1919-20.

A. Wyoming.....	3,600,000
B. Idaho.....	3,070,000
C. Ohio.....	2,960,000
D. California.....	2,940,000
E. New Mexico....	2,670,000



Fig. 120. The map of New England in the center of Texas helps us understand how large are Texas and the regions which it helps to make.

The cool nights that come with high elevation make the climate good for potatoes. If the demand should arise, the irrigated sections, which can be considerably enlarged, might grow great quantities of potatoes. Enormous quantities are now grown at Greeley, Colorado.

By the use of the tractor and of the new drought-resisting crops, such as Kafir corn, sorghum, Turkey Red wheat, and barley, large areas of this country may be cultivated and made to produce great quantities of food.

This land should always be the home of those who love animals, the out of doors, the wind, the sunshine, and the wide spaces of the earth.

PART II.—THE LOWER RIO GRANDE VALLEY

114. A hot, dry land.—South of latitude 32° the high plains slope down to the Rio Grande. The slope is rough, dry, and hot. The ranchers here keep many long-haired goats that supply the wool for making mohair cloth.

The lower valley of the Rio Grande is low and hot. It is made up of sand dunes, swamps along the coast, thickets of stunted chaparral and mesquite trees, and wide stretches of poor pasture land scattered with shrubs.

Add water and this land blossoms with crops. Rich irrigation districts lie along the streams. Laredo and Brownsville are well known because they send onions and other vegetables to northern markets early in the spring. Several places are now growing oranges and grapefruit.

113. Development.—Plainly, this will be a land of large ranches for many years, but it may easily produce butter and dried milk if need arises.

The cool

QUESTIONS

1. Name the states and countries included in this region. 2. What advantages has life on the Great Plains over life in the Cotton Belt? What disadvantages? 3. Name the products typical of the Plains. What goods does your region produce in return for the products you receive from them? 4. Why is Denver called the "Mile-high City"? (Fig. 91.) Tell why it has become the metropolis of the Plains area.

5. Suggest reasons for considering the Great Plains as a region separate from its neighbors. 6. Measure with your map scale its length and breadth. How many countries the size of France might be placed within the Plains area? 7. Find this region on Figure 494. Will it ever have a city the size of Chicago?

8. Write the story told you by an old Indian chief of his life on the Plains when he was a boy, and of the many changes which have taken place since. 9. Find all the interesting facts you can about any one of the following: The Belle Fourche Irrigation Project; Dry Farming; the City of Pueblo; Colorado Springs. 10. Why does the rancher of the Great Plains ship his cattle to the Corn Belt? (Sec. 75.)

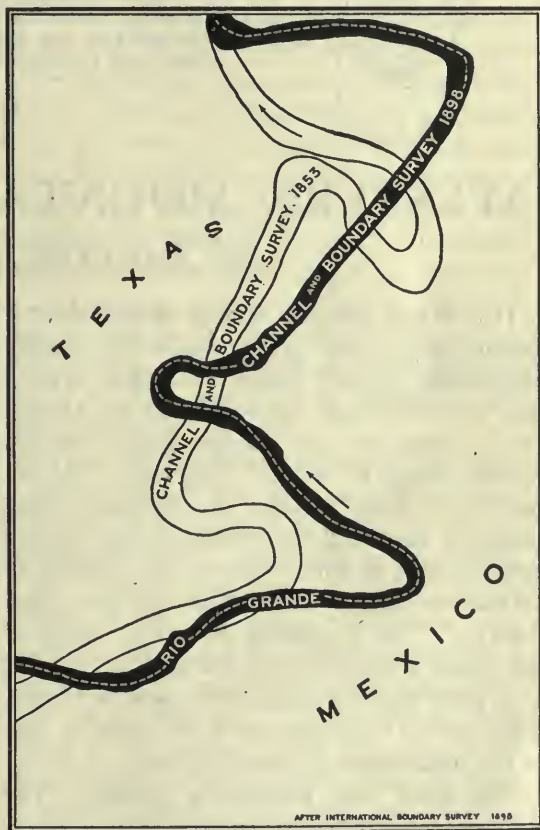


Fig. 121. Once upon a time some men who did not know the habits of rivers made the Rio Grande an international boundary. On its flood plain this stream, like all other streams on flood plains, flows in curves, called meanders, cuts the outside of its curve and changes its course. People along its banks are always wondering in which country they will be after the next flood.

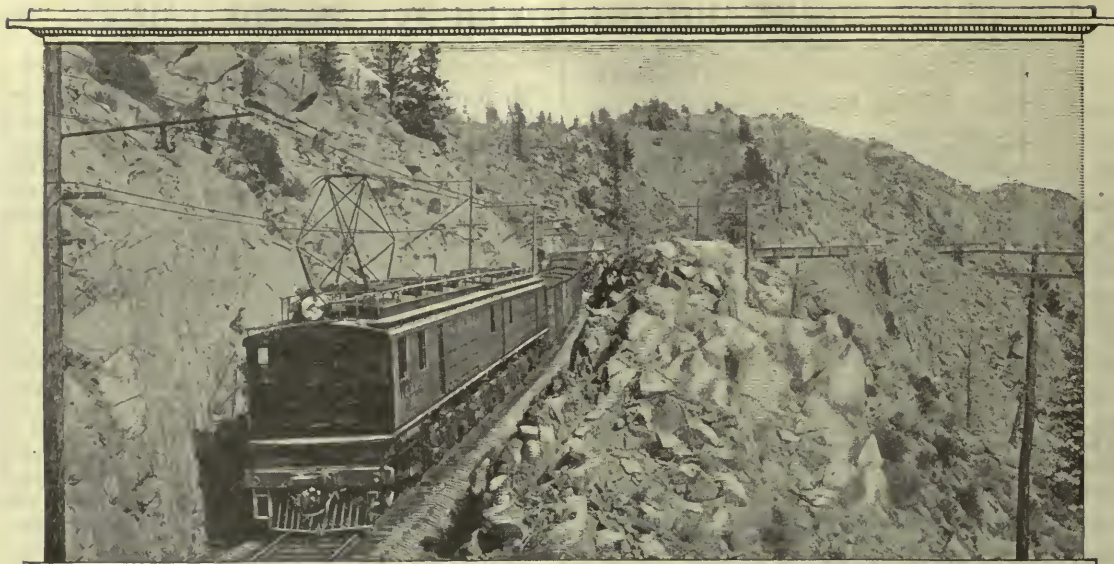


Photo. Brown Bros., N. Y.

Fig. 122. An electric locomotive pulling four million pounds of freight over the Rocky Mountains. In one day this locomotive will pull over the mountains more freight than a thousand horses could pull across in a week.

WESTERN MOUNTAINS AND PLATEAUS

THE SOUTHERN ROCKY MOUNTAINS

115. What are the Rocky Mountains?—Geographers have given the name Rocky Mountains to the great mountain system that extends from New Mexico to Alaska. It is composed of many, many ranges. Name three of them (Fig. 91). Many beautiful, wide valleys lie between these ranges of the Rockies. Some of them are as large in area as one or two of the counties of an eastern state. Sometimes they are called "parks." In Wyoming the high valley of the upper portions of the North Platte River is so wide that it is called the Laramie Plains. This valley is higher than the tops of any of the mountains of New England.

116. How the mountains appear.—The Rocky Mountains are a wonderland of high, sharp peaks and great mountain ranges, many of which are snow-covered all winter and most of the summer. To reach the top of most of these lofty peaks, a traveler must climb all day on foot, at the risk of his life,

and when he has reached the top, especially in Canada, he can sometimes see nothing but other snow-capped peaks and jagged rocks. There seems to be an endless procession of peaks, in front of him, behind him, to the right, and to the left, as far as the eye can see. Below the snow-capped peaks are places where in summer there are wide pastures, and still lower down on the mountainsides there are forests of evergreens clinging to the rocky slopes. Here and there are beautiful valleys dotted with farms and mining towns. High up the mountains, in gorges and canyons, clear, cold streams tumble and roar in foaming white waterfalls as they rush down to flow at last into some irrigation ditch in the Great Plains far to the eastward.

117. Bounds of the region.—White men have settled in these mountains and built railroads through them as far north as Peace River in latitude 56° . In latitude 55° the Canadian Grand Trunk Railroad crosses



Courtesy Lou. D. Sweet

Fig. 123. In the Rocky Mountains, and at the western edge of the Great Plains, one can see many scenes like this. What signs of man's work can you find? Point out the bench land. (Sec. 124.)

over from the wheat country into the valley of the Skeena River, and reaches the Pacific Coast at Prince Rupert. To the north of this white men have not settled the mountains, except at a few fur-trading posts. The region is left to roving bands of Indians, and to grizzly bears, caribou, and other wild animals. We call this region the Southern Rocky Mountains.

118. Crowds and lonely men.—Although these mountains are in most places a region of few people and of lonely men, crowds of men work together at the mining towns and in the lumber camps. The lonely men are the prospectors looking for ore deposits, the forest rangers watching for forest fires, and the solitary sheep herders tending their flocks.

119. Mining and cities.—Mining is the chief industry of this region, many deposits of gold, silver, copper, and lead having been found here. Most of the cities in the mountains were built at the mines. Many of these settlements began as mining camps far from a railroad. Sometimes dozens, hundreds, and even thousands of men have lived for a time in these tent towns, away back in the mountains where the only freight carrier was the pack mule, with bundles balanced across his saddle. The pack mule clambering over the rocks could do the work if the gold or silver deposits were rich enough to pay the high freight. The cost of living

was very high at first because the men had to live on food brought from a great distance.

The largest of these many mining cities is Butte, Montana, where live thousands of people who work in the copper mines in the wonderful hill of Butte. This hill is seamed through and through with hundreds and thousands of veins of copper. Anaconda, Helena, and Great Falls are busy smelting ores of copper, gold, and silver. Electric power for much of this district comes from the falls of the Missouri River at Great Falls. Cripple Creek, Victor, and Leadville are mining towns in Colorado.

The town that depends upon the mine may not be long-lived, for, at best, mining is an industry that takes all of its product out, and finally leaves nothing but a hole in the ground.

The future promises gigantic mining industries here. In Idaho, Montana, and Wyoming, there are enormous deposits of phosphate rock which we can use when others are worked out. In the Green River Plateau at the corner of Utah, Wyoming, and Colorado is 100 square miles of shale rock several hundred feet thick and yielding a barrel of petroleum to the ton when distilled (Sec. 141). We may soon find hundreds of thousands working here in one of the world's greatest industries.

120. Lumbering in the mountains.—Although the tops of the Rocky Mountains are



Fig. 124. Machinery for concentrating copper ore at the Anaconda Copper Mining Company, Anaconda, Montana. Why does it take large sums of money to run a copper mine?

for the most part bare rock, the lower slopes are cut into hundreds and thousands of little side valleys and gulches, wherever green trees cling to the steep and rocky slopes. Altogether these mountains have tens of thousands of square miles of forest, but because of the difficulty of taking lumber to the distant city markets, only a very small part of the timber has been used. How far is it from the Big Horn Mountains to Chicago? from West Virginia to Chicago?

It is hard to take lumber from the mountains for two reasons: first, in many places the land is too rough for roads to be made; and, second, the streams are too rocky to float the logs. Sometimes small logs are used to build a chute or slide several thousands of feet in length down a mountainside. Upon it other logs can coast down. Sometimes the logs go at such speed that if they jump out of the chute they tear themselves to pieces on the rocks. The only way to stop them at the end of the chute is to have them jump into a pond of water. (Fig. 126.) In other

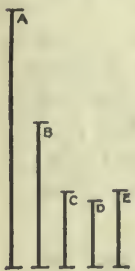


Fig. 125. The five states leading in gold production (1919-20):

A. California.....	\$15,851,750
B. Colorado.....	8,931,350
C. South Dakota.....	4,745,550
D. Nevada.....	4,107,000
E. Arizona.....	4,776,050

places the lumber, sawed into boards, is floated for miles down the rocky valley in a wooden flume or trough.

121. National forests.—Our Congress very wisely decided to keep many of these forest lands as the property of all the people. The United States Government owns many thousands of square miles of forests covering a large part of the Rocky Mountain region. A part of the United States Department of Agriculture, called the Forest Service, has charge of these forests,

and is protecting them until the time comes to use the trees. The forest has two great enemies—over-pasturing and fire. Of these, fire is much the worse.

The National forests are watched and protected by forest rangers. The ranger makes long lonely rounds on foot or on horseback, or more recently by airplane, looking for fires, because one fire may kill centuries of growth. He climbs high cliffs, mountain peaks, and even lookout towers,



Courtesy West Coast Lumberman's Assn.

Fig. 126. A Rocky Mountain lumber camp, log chute, and storage pond. Could you move a log in a pond?

so that he can look far, far away across the forest. If he should see through his spy-glass the smoke from a small fire, he would signal for help to put out the blaze before it could spread. The fire fight is all planned in advance. Axes, shovels, and other tools are in readiness. The places to work have all been planned, but even with the best of care the fires sometimes leap through the tops of the evergreen trees and run with the wind, killing millions of fine trees. Careless campers, miners, and sheep herders start some of the fires, and some are started by lightning. The forester tries to protect the forest so that it will be a forest for all time.

122. Vacation land.—The Rocky Mountains are a glorious vacation land for those who love mountain scenery, and who enjoy wild, uninhabited places. On the eastern edge of the Rocky Mountains near Colorado Springs is Pike's Peak, to the top of which runs a railway that enables people easily and comfortably to reach its summit, over 14,000 feet high. If you love high climbing, there are snowpeaks and glaciers waiting for you. If you love to climb only a little, there are wooded spurs and lower mountains to explore.



Courtesy National Park Service

Fig. 128. Campers having a vacation on Bear Lake, Colorado. Where do they cook?

If you like to fish, you can wade up the rocky bed of trout streams in which perhaps no other person has fished for a year.

Many of the more beautiful and wonderful places of this region have been set aside as parks by the American and Canadian governments. In this way such places belong to all the people for all time. The Yellowstone Park, in the corners of three states, is larger than the states of Rhode Island and Delaware combined, and is one of the most famous of the National parks. Since no one may hunt there, bears, elk and bison abound, and some are as tame as cows, and come close to visitors to be fed.

Yellowstone Park has wonderful geysers, and there also are waterfalls and volcanic mountains of glass-like rock. The wonderfully colored walls of the canyon of the Yellowstone River are more than 1000 feet high. It is too bad that, for most of the people of the United States, it is such a long journey from home to this land of delight.



Fig. 127. Lake McDermott, a lake in the Glacier National Park, Montana. Can you see the timber line on Grinnell Mountain? Similar views may be had in other parts of the Rockies. In this part the Government has made roads and camps so that tourists can live in the mountains very inexpensively. Where would you like to camp, and what would you do here?

123. Agriculture.—When the first miners came to the Rocky Mountains food was very expensive because it had to be brought from such great distances. The first farmers in valleys near the mining towns or camps sold their fruits and vegetables at prices that were several times as high as prices in New York or Chicago. This made farming very profitable in the mountain valleys and more farmers came, until finally there was a sad day when the crops were so large that the home market did not need all that there was to sell. Some had to be sent away across the Great Plains to the eastward. Before that time the farmer in the mountain valley had been able to get eastern market prices for his produce, plus the railroad freight and the wagon haul to the mining camp. But when he sent his goods to the eastern markets, he had to take the eastern price, less the cost of carriage to that market. This cut into his profit so much that he now raises grass and hay in many Rocky Mountain valleys. He could produce many other crops if only he could market them profitably.

124. Bench lands and fruit.—When mountain glaciers covered some of the Rocky Mountains and reached down to the plains, many of the smaller mountain valleys were

lakes. Some of these glacial lakes were filled with sand and earth that was washed down from the hills. Since the glaciers disappeared, the streams have cut valleys in these filled-up lake beds, leaving step-like land called terraces or benches (Fig. 123). Bench land makes very fine farms. It is level, smooth, and free from stones, and the good soil is many feet deep. Many of the benches can be irrigated by water from mountain streams. In some of the valleys, orchards of peaches, apples, and cherries have been planted; in others, hay and grain are raised. In some valleys there is not enough water for irrigation, but wheat is grown by dry farming (Sec. 108).

125. Crop rotation.—One irrigated Colorado bench farm has the following system: first year, potatoes; second year, wheat; third year, barley. After the barley, alfalfa is sown, which makes hay during the fourth, fifth, and sixth years. In the seventh year the land is again plowed, and the rotation begins with potatoes. The temperature of the mountain valley is just right for potatoes, and there is plenty of water, so that an acre of land very often yields 400



Courtesy "The Country Gentleman"

Fig. 129. An irrigated peach district in the Rocky Mountains. Find the orchards, shade trees around the houses, a river, and two irrigation canals. The large one with the bridge over it leads into a tunnel. The smaller canal at a higher level is in a wooden flume. Its water can be seen at the left and at the right of the picture. Why would you say the cliff at the right had layers of hard rock and layers of softer rock?

bushels. The potatoes are of fine quality for hotel use. The wheat goes to market; the barley and alfalfa fatten thousands of lambs, brought in from the ranches, before being sent to Chicago, Omaha and Kansas City packing houses.

126. Sheep and cattle.—The sheep from the Rocky Mountain region are more valuable than all the other crops that are sold. When summer dries the grass upon the lower lands to the east and the west, the sheep herders with their dogs and pack horses drive the flocks up on the mountain. There the sheep pasture in the open valleys and browse through the forests, and even go to the grasslands above the tree line, where there are large areas of summer pasture. In the autumn the sheep eat the barley and alfalfa of the valley farms; thus these crops go to market in the cheapest way. (Sec. 75.) Many cattle also are pastured in this region.

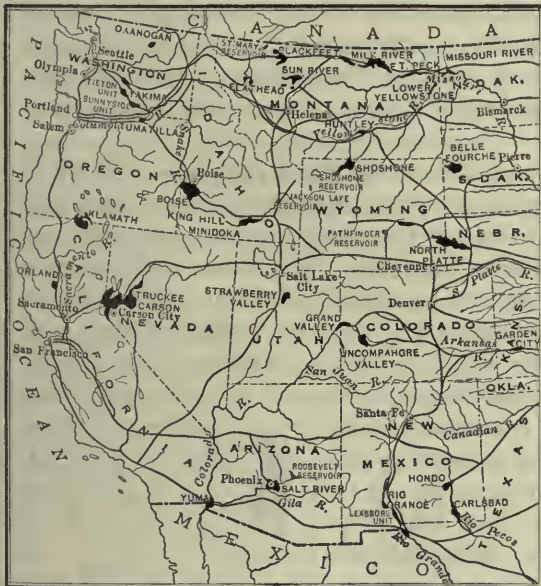


Courtesy U. S. Reclamation Service

Fig. 131. A Wyoming farmer irrigating his alfalfa field with water from the Shoshone reservoir. The ditch is dammed for a few hours by a piece of canvas, which turns the water into the field. Why is it often necessary to level the fields before irrigating them?

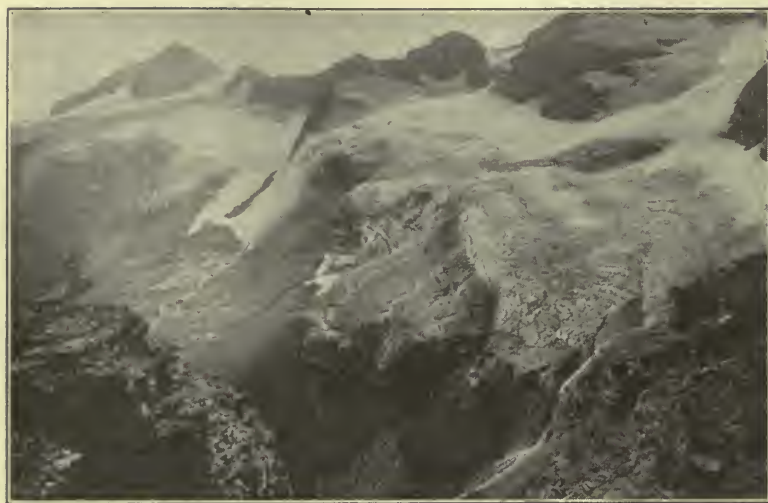
127. Future.—Tell about the future of the town that mines gold, silver, or copper (Sec. 119); of the town that ships lumber and wood-pulp for paper-making (Sec. 121). The Rocky Mountain waterfalls can furnish power for many cities. Already on a railroad going to Seattle from Chicago, electricity from water power is used for 440 miles on the steep grades in the mountains.

If the needs of our people make it necessary to use fully the resources of this region, we may expect the national and private forests to be carefully protected from fire, so that they may regularly yield harvests of wood. Many lower slopes as well as higher slopes can be pastured; the valleys can be made into orchards, or intensively cultivated in vegetables, potatoes, wheat, barley, oats, and alfalfa. Some reservoirs have been built to hold water in the mountain valleys until the farmers want it to irrigate the plains below. Some day nearly all the water of the Rocky Mountains may thus be held until the season comes when it is needed for crops. On its way down to the plains it can turn water wheels, make power for lighting and even heating houses, and run factories and railroads for two or three hundred miles around. There will be another advantage because the dams will prevent floods.



Courtesy U. S. Reclamation Service

Fig. 130. Map showing the irrigation projects which the United States Government has built for the people, and the main railroads of the region.



© Scenic America Co. Courtesy National Park Service.

Fig. 132. Rocky Mountains in Glacier National Park, Montana. The snow-field merges into the rough and melting glacier. What may the water do?

QUESTIONS

1. What states are wholly or in part within the Rocky Mountain Region? 2. Complete the following chart:

THE PRODUCTS OF THE ROCKY MOUNTAINS.

GRAZING.	MINING.	FORESTRY.	AGRICULTURE.

3. Under what conditions will most of the present uncultivated valley lands be taken up with farms?

4. Why do sheep rather than cattle graze for the most part on the mountain pasture?

5. Complete the following:

HOW I STUDY THE TOWNS OF THE ROCKY MOUNTAINS.

NAME OF TOWN.	LOCATION.	WHAT I SHOULD REMEMBER ABOUT IT.

6. Why should our government preserve large areas of the Rocky Mountains as national forests? How is the airplane useful in protecting these great forests?

7. Relate a story, such as might have been told you by a lone prospector, of his wandering life among these mountains in search of gold.

8. Why are the Rockies forested while the adjacent plains and plateaus are treeless? What is meant when the Rockies are spoken of as a watershed? What effect do the Rockies have upon the Great Plains? upon irrigation? 9. Arrange a mock trial of one of your classmates. Charge him with causing a great forest fire while camping in the mountains. 10. Debate the following question: "Resolved, that it would be better for the United States, had the Rocky Mountains been level land." 11. If you had a week in the Rocky Mountains what would you choose to do? 12. Tell one fact which you have learned about the southern Rocky Mountains from each picture and map in this chapter.

THE COLUMBIA BASIN AND THE GREAT BASIN

128. Rich volcanic soil.—

A farmer in the state of Washington had a thousand acre wheatfield on which he grew, in one year, forty-six thousand bushels of wheat. This is a very large yield indeed. The average yield of wheat in the United States is only about one-third as much per acre. Still more wonderful to relate, this field had been in wheat for thirty-one successive years. The

farmer of Indiana or other eastern wheat-growing states never thinks of raising wheat for more than two or three years on the same ground, because the crop becomes poor, and the land must be given a rest, by growing some other crop. Why do the Washington wheatfields yield so much? Two strange words give the answer: volcano and lava. Once upon a time great volcanoes poured out floods of melted rock, called lava, that flowed like water, and covered nearly 200,000 square miles of land in the Columbia Basin and the Great Basin. How do men know this? Some river canyons help to tell us. Examine Fig. 134.

129. The Snake River canyon.—This river, like many other streams in this basin, has cut through the lava a narrow, deep valley, or canyon (Fig. 142). The Snake River canyon is several hundred miles long, three to four thousand feet deep. In the wall of that canyon one can see layer after layer of lava rock of various colors, sometimes with the upper edge of one flow turned into a layer of soil and then buried by the next flow (Fig. 134). At the bottom, is the surface of the old land surface that was buried by lava.



Fig. 133. The Columbia Basin and the Great Basin.

130. Why lava soils are rich.—The lava has been on the surface long enough to decay and turn into a deep soil, so very rich that it makes the Washington wheat-fields yield more per acre than those of any other wheat region in America. Why is lava soil so rich? Because it is new. Most soils are second-hand soils, third-hand soils, or even older than that. Think for a moment of the sands of Florida. They were washed down there when Florida was sea bottom. The geologists will tell you that the rocks in Georgia, from which some of the Florida sand was washed, were made of material washed there from some other place. Soil may have been moved in this way many times. All this washing soaks out some of the plant food, and leaves many of the old soils poor. But the lava is fresh, new stuff out of the crust of the earth, and is rich in plant food. This lava soil covers about 200,000 square miles of the surface of the wide upland region lying between the Rocky Mountain System and the Pacific Mountains.

131. Bounds and climate.—Name four mountain ranges that bound this region. The northern part, drained by the Columbia River, is called the Columbia Basin. The southern part, with no stream reaching the sea, is called the Great Basin. (Map, Fig. 91.) Because of its fertile soil the people of the Columbia Basin like to call their region "The Inland Empire."

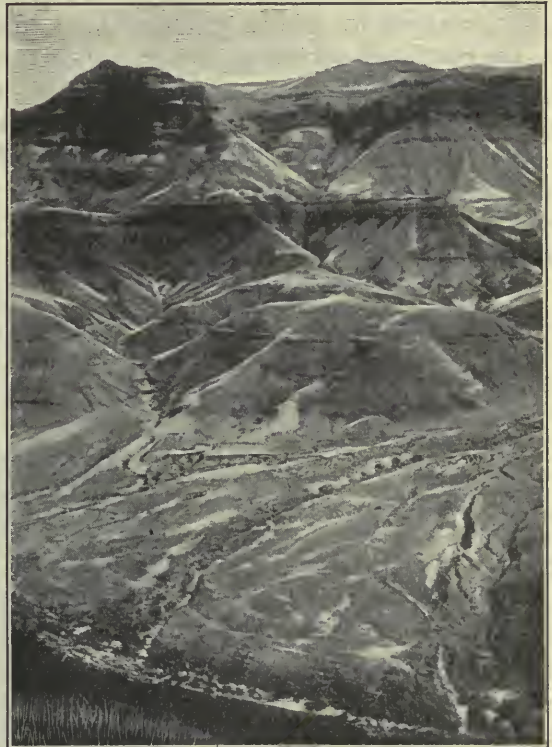
The Basin region has a healthful climate, which is much milder than that of the Great Plains on the eastern side of the Rockies, because the prevailing winds are warmed by the waters of the Pacific Ocean. There is but little snow in winter, and while the summer sun is hot, the nights are cool. If it only had enough rainfall everywhere for good agriculture, the Basin region would be a better agricultural country than France or Germany.

PART I.—THE COLUMBIA BASIN

132. Agriculture.—The great drawback to agriculture in the Columbia Basin is the light rainfall. How much does it have per year?

(Fig. 158.) Only in the higher parts of eastern Washington and eastern Oregon is there enough for wheat and barley. Lower districts in both Snake and Columbia valleys are so dry that they are used only for pasture, except in those lucky places where water from mountain streams can irrigate the valleys. There heavy harvests of alfalfa, corn, potatoes, wheat, oats, sugar beets, fruits, and other crops are grown intensively in many rich farming districts. The sheep and cattle pasture on the ranges and in the mountains, but fatten on the alfalfa in the irrigated valleys.

133. Wheat.—Most of the little rain that does fall comes in the winter season. Consequently winter wheat does well because it is a native of countries having winter rain and dry summers. The plant thrives in the rains of the mild winter, and, in the bright sunshine of the dry summer, ripens large, fat grains. In the eastern states, where beating summer rains are frequent, the wheat



Courtesy U. S. Geological Survey
Fig. 134. The side of the canyon of Salmon River, Idaho, showing the different layers of lava. What signs of water work do you see here?



Fig. 135.—A view across an irrigated valley in the Columbia Basin, Yakima, Washington. Did you ever see an apple box with the name Yakima on it?

Courtesy U. S. Reclamation Service

must be cut before the heads are fully dry, and then must stand in shocks or stacks until dry enough to be threshed. But in the Columbia Basin the summer weather is so free from storm that the ripe wheat may wait several weeks before it is cut. The climate is so dry that harvesting and threshing are done at one time by using a great machine called the combined harvester, that cuts the wheat, threshes out the grain, and even puts it into sacks which it carries along. Wagons meet the harvester, and haul the grain to the station.

In many places in eastern Washington, eastern Oregon, and Idaho, where the rainfall is a little less than 20 inches, wheat is grown by the dry-farming system (Sec. 108).

134. Apples.—On the western edge of the Columbia Basin are three small irrigated valleys famous for apples. They are the valleys of the Hood River, in Oregon, and of the Yakima and the Wenatchee in Washington. All three rise in the Cascade Mountains and bring water to the apple orchards in the valleys below. Millions of school-boys and girls have seen

this handsome fruit which is sent in beautifully labeled boxes to cities and small towns east of the Rockies.

135. Transportation and cities.—The United States Government has built a canal around the rapids in the Columbia River, at the place where the river breaks through the Cascade Range. Thus steamboats can now go up the river and its branch, the Snake, as far as Idaho. (Fig. 80.) Otherwise transportation in the basin is by

railroads which cross the Cascades to Seattle, Tacoma, Olympia, and Portland. Eastward these roads cross the Rockies, and make the long routes to Duluth, Minneapolis, and Chicago. From these cities many manufactured goods are forwarded to the distributing centers of the Inland Empire. Spokane, Washington, and Boise, the capital of Idaho, have many wholesale stores that supply farmers in the plain and the miners in the mountains. The region has been settled too recently to have much manufacturing.

The very fertile soil and the good, wholesome climate make this region one of the



Fig. 136. Looking up Hood River Valley, Oregon, at Mt. Hood. What use is man making of this valley? Why is the snow peak like a reservoir?

world's great natural grain-producing centers. The country is so new that a part of central Oregon, although it has enough rain for wheat, has as yet no railroads. Many more mountain valleys may be turned into storage lakes to increase irrigation. (Fig. 138.) Even then, thousands of square miles of fertile soil must depend for their water upon a rainfall that is too small. However, there is the Columbia River, a great stream fed by the snows on the mountains of British Columbia. Much water flows along in its deep valley, several hundred feet below the fertile, rolling plains that are thirsty for water. Can man find some way to get water from the big river up to the rich, rolling plains above? It is an interesting problem that Nature gives to man. Already long canals are planned to irrigate land west of Spokane with water from the upper Columbia.

Electric power from mountain waterfalls on both sides of the Basin could be carried to all parts of the Basin (Fig. 194). This resource gives great possibility of manufacture. The cities nearer the sea have a better location in this respect, and they too have electric power from mountain plants.

PART II.—THE GREAT BASIN

136. Swimming where you cannot sink.—How would you like to swim in a lake where you could not sink? The people of



© Brown Bros., N. Y.

Fig. 138. Comparison between the Arrowhead Dam, 348.5 feet high, built to hold irrigation water in Idaho, and the Flatiron Building, 286 feet high, New York City. Drawn to scale. Of what is the dam made?

Salt Lake City do this whenever they go down to the beach of Great Salt Lake to bathe. The water is heavy with salt.

137. Streams that do not reach the sea.—The basin between the Sierra Nevada Mountains and the Wasatch is shut in by mountains so that winds from the sea cannot bring much rain. As a result it has less rain than any other part of the United States (Fig. 158). No stream reaches the sea. The Mississippi, you remember (Sec. 36), carries mud and sand, with which it builds a delta in the Gulf of Mexico, but the streams that flow down into the Great Basin must leave their sand and mud in the Basin itself.

In some places the streams take up salt from the mountain rocks, and make salty lakes. In other places they gather a little soda, which is carried into the lakes year after year. One such lake, called Soda Lake, is so full of soda that millions of tons may be had by evaporating its waters. Another small lake in California, called Saltes Lake, is so nearly dried up that its bed is full of coarse grains of salt much like sand. In between the salt grains a little water remains, which is full of potash. (Sec. 43.) During the World War, when our supply of potash from Germany was shut off, some potash was manufactured by evaporating the water from this lake.

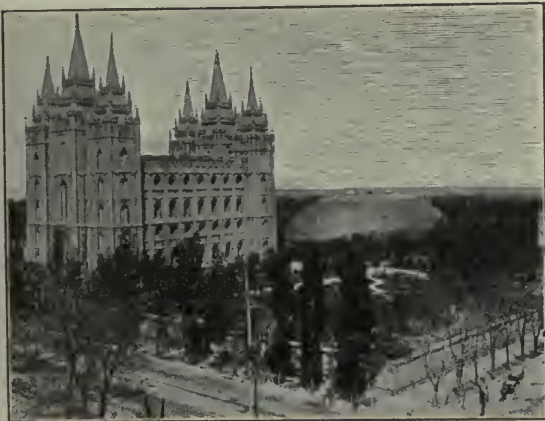


Photo. Brown Bros., N. Y.

Fig. 137. The Mormon Temple and the Tabernacle at Salt Lake City, Utah.



Fig. 139. A western valley before irrigation; a poor pasture. It takes several thousand acres of it to support a family.

Courtesy Dept. of Interior

For millions of years the rains have been beating on the mountains in and around the Basin, and the streams have carried away the mountain soil and with it built up level, flat plains. Some of these valleys are now so level that after a big rain the water stands in lakes which are only a few inches deep and many miles long. After a few weeks of sunshine the lake becomes a plain of mud which, as it dries, cracks up into cakes that are so hard they ring beneath the hoofs of a galloping horse (Fig. 141). Old beaches can be plainly seen on the hills above many of the lakes of the Great Basin. These interesting old beaches were made long ago when the rainfall was greater than it now is, and the surface of the lakes was higher.

138. Death Valley.—Most of the Great Basin is a plateau from 4000 to 5000 feet in height, but the land in Death Valley, California, is lower than the level of the sea. So little rain falls near Death Valley that no lake exists in the valley bottom, and many miners have died of thirst and heat as they searched here for gold. It is strange to think that only

a hundred miles away from Death Valley, on the other side of the Sierra Nevada, in the same state of California, there are beautiful cool evergreen forests and plenty of rain. The Wasatch Ranges at the eastern edge of the Basin are also covered with fine forest.

139. Rich garden spots.—The Basin soils are rich because they have not had the fertility taken out of them by soaking rains or the roots of many hungry plants. Only water is

needed and this is furnished by the streams from the Sierra and Wasatch which supply two of the important irrigated districts of the United States. Utah has the greater of these two irrigated districts. Indeed most of the farmers of the state depend upon the Wasatch waters which cause the rich Basin soils to produce splendid crops of wheat, potatoes, sugar beets, peaches, apples, pears, cherries and other fruits and vegetables. Alfalfa is a very important crop and helps to feed the sheep and cattle from Basin ranches and the mountain pastures; and many dairy cows as well. The first irrigation in the United States was started by the



Courtesy Dept. of Interior

Fig. 140. Sugar beets. The same valley shown in Fig. 139, after irrigation has made it a farm. A farm of 40 to 80 acres now supports a family.

Mormons in this land of grain, alfalfa, cattle, and fruit. In one case, a tunnel now brings water through the Wasatch Mountains from a branch of the Colorado River into the Great Basin. It flows down and irrigates some of the rich, level plains that stretch away to the westward from the foot of the Wasatch.

The waters of the Truckee and the Carson rivers, fed by the melting snows of the Sierra Nevada, are carefully stored in reservoirs built by the United States Government. When needed the water is let out on the plains around Carson City, where several hundred thousand acres of the rich desert soils are irrigated, producing large crops of sugar beets, alfalfa, wheat, fruit, and potatoes. Elevation makes the nights of the plateau so cool that not much corn is grown. Alfalfa (Fig. 108) is the chief Basin forage crop.

140. Dry farming and ranching.—In parts of eastern Utah enough rain falls to produce



U. S. Geological Survey

Fig. 141. A summer view of a Great Basin playa lake. Silver Lake, California, a flat expanse of salty mud cracked open and baked hard. Would it make a good field? What is it like at the time of rains? (Sec. 137.)



Courtesy National Electric Light Association

Fig. 142. Snake River Canyon. A low dam and water-power plant. The big building helps us to understand how high the canyon wall is.

cattle. Some of the mid-Basin ranges are high enough to catch a little rain, and are scantily forested. Here and there a little stream comes out to irrigate a field or two. In some other places there is no water.

141. Mining.—The broken rocks of the mountains give the prospector a good chance to find ores, and many rich mines have been opened in the Great Basin. Virginia City, Nevada, was once a very famous silver-mining center. Then gold mines were found at Tonopah, Goldfield, and Bullfrog, and many miners went to work in the hot, treeless desert. The population of the state nearly doubled between 1900 and 1910. Recently copper ores have been found so near the surface in eastern Nevada that ore can be scooped up by steam shovels and loaded into freight cars. Utah also has copper. Bingham, near Salt Lake City, has one of the largest copper mines in the world. We may expect prospectors to find still more mines in the Basin ranges. A great industry may arise from the oil shales. These are already being worked at Elko, Nevada. As early as 1852, the Mormon settlers put up a home-made still and boiled petroleum out of the shale rocks (Sec. 119). For many years the Scotch have been distilling petroleum from oil shales not so rich as those of Nevada, Utah, Colorado, and Wyoming.



Fig. 143. Tonopah, a town in the Nevada desert without shade trees, crops, streams, or grass, but gold mines brought railroads and prosperity.

142. Power from the sun.—The Colorado River and the Sierra Nevada Mountains are near enough to send electric power to this region by wire, but it is possible that some day men will find a way to get power from the heat of the sun. If that happens, Death Valley and the Mohave Desert, with their blazing heat, may become as important as any coal field in the world, because millions of horse power could be constantly sent by wire over the mountains to the coasts and valleys of California, where it is comfortable for people to live and work, and where it is easy to carry on commerce.

QUESTIONS

1. Would you prefer to live in the Columbia Basin or in the Great Basin? Give reasons for your answer. What would you do for a living? 2. What is the population of Nevada per square mile? of your state? (See Appendix.) How do you account for the differ-

HOW I DISTINGUISH BETWEEN THE GREAT BASIN AND THE COLUMBIA BASIN.

	GREAT BASIN.	COLUMBIA BASIN.
Soil.....		
Rainfall (Fig. 158).....		
Temperature (Figs. 328, 329).....		
Rivers.....		
Agricultural products.....		
Mineral products.....		
Water for irrigation and power.....		
Cities.....		

ence? 3. Trace the railroads (Fig. 309) which connect the basin area with the outside world. State the western terminus of each road; the eastern terminus. What do these roads haul? 4. Locate the Columbia, Snake, Hood, Yakima, Wenatchee rivers. Tell definitely the service each renders to the people living in its valley. 5. Name and locate the chief irrigation projects (Fig. 130) in the two basins. Will it ever be possible to irrigate as much as one quarter of this region? Give reasons for your answer. 6. Which basin can irrigate the larger part of its land?

7. How is the boundary between the Great Basin and the Columbia Basin determined? 8. What does the railroad map (Fig. 494) tell you about the Columbia Basin? the Corn Belt? Give reasons for your answer.

9. Describe the journey which a box of apples would make on the way from Hood River to London. 10. Prepare a poster advertising these apples to the people in London. 11. Why are basin lakes, so salty? 12. Make a short catalog of the pictures in this chapter as in question No. 9, page 36.

13. Write a short news article for your school paper on "Power from the Sun." 14. What would it mean



Fig. 144. Map of North America showing annual average rainfall. What rainfall line divides the United States into two nearly equal parts?

to say that the railroads planted the apple orchards? 15. Model in damp sand the Basin areas: show the eastern mountains, the basins, and the western mountains. Indicate in some interesting way the rivers, cities, and chief products of these regions.

SOUTHWESTERN PLATEAUS AND MOUNTAINS

143. Character and appearance. — The Southwestern Plateaus reach from northwestern Colorado

southward through New Mexico and old Mexico to a point about a hundred miles south of the City of Mexico. Nearly all of the surface of this plateau is higher than any part of the Appalachian Plateau. The Mexican part of the plateau or high plain is higher than the American and therefore has a cool, healthful climate, although within the tropics. People need warm bed clothing at night.

This vast region is a dry and lonely land. Only in the highest parts is there enough rain to support forests. On most of the plateaus the bare earth shines out between scattering clumps of bunch grass and shrubs, for the water supply is very



Courtesy National Park Service

Fig. 146. A view from Zuni Point, showing the Colorado River and the marvelous canyon it has cut in the rocks of the high plateau. (Fig. 239.)

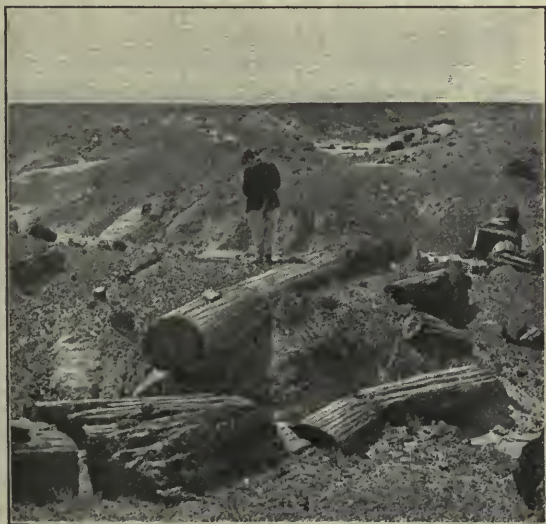
scanty. In every hillside are "barrancas," or gullies, that run with water only in the few short hours of rain. An American soldier, hunting for the Mexican bandit Villa, had traveled many weary days over the Mexican part of this plateau. He said of it, "This is a country with more streams and less water, with more cows and less milk, and where you can look farther and see less than in any other country of the world." Water is so very scarce that the natives have learned to go for a long time without it. If you ask an Arizona Indian to have a drink of water, he will sometimes say, "No, thank you, I drank yesterday."

At many places on the surface of the plateau there are flat topped hills called *mesas* (Spanish for table). (Fig. 148.)

144. Bounds.—Bound the Southwestern Plateaus. On the northwest is a wild cliff called Hurricane Ledge (Fig. 239). On the southwest are the high mountains of western Mexico, where the Indian tribes rarely see a white man. In Texas and northwestern Mexico, the eastern edge of the plateau gives way to the lowlands by great "breaks," or



Fig. 147. Diagram to show the broadening of valleys from youth to old age. A young valley is shown at 1. In time this valley will deepen and broaden as 2, and later as 3, 4, 5. Figs. 142 and 146 show young valleys.



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Fig. 145. A petrified forest (logs turned to stone), dry gullies, and dry land vegetation at Walbrook, Arizona.



© Ewing Galloway, N. Y.

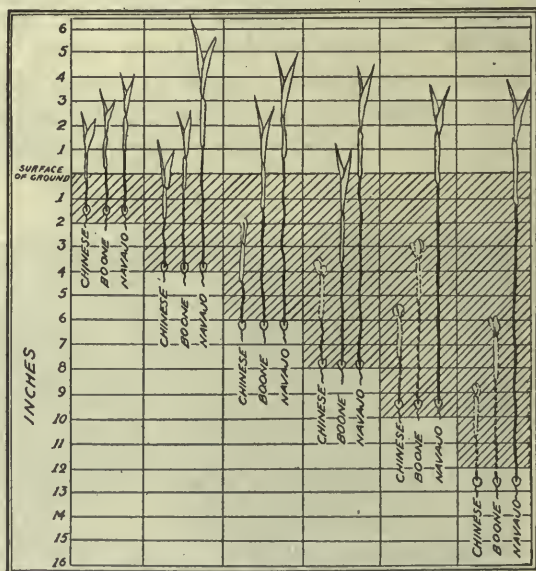
Fig. 148. A Hopi Indian village on the top of a mesa, Hopi Reservation, Arizona. Would this place be hard or easy to defend?

steps, somewhat like the cliff in Fig. 129. South of the Rio Grande Valley, the eastern boundary of the plateau is a mountain, which rises above the plateau one or two thousand feet, and then plunges steeply down toward the Gulf of Mexico, as the western mountains do toward the Gulf of California and the Pacific.

145. Colorado Plateau and Canyon.—The most interesting part of all this plateau is that called the Colorado Plateau, drained by the Colorado River. This section is quite different from its neighbor, the Great Basin. The Great Basin, you remember (Sec. 137), has valleys filled with soil washed from the mountains. In the Colorado Plateau this whole country is high, the rivers have carved deep canyons in the hard, bare rocks (Fig. 239). A special railroad has been built to the place called Grand Canyon, Arizona, at the edge of a very famous valley. Many tourists go there to look into the deepest gorge in the world. There one may sit on the edge of a precipice (Fig. 146), and look straight down for thousands of feet, even a mile, and see at the very bottom of the valley

the river shining like a little silver thread. This famous river has cut its gorge through rocks of many colors. In the morning, one side of the canyon lies in deep shadow. The variously-colored carvings on the other side shine in the sun. The view changes every hour. A thundercloud may rise up from the river, and while it is still far down in the canyon will throw back its moisture in a shower. The top of the cloud shines in the sun, while lightning flashes in the gloom beneath the cloud, and thunder echoes from cliff to cliff.

146. People.—On these Plateaus the native Indian makes up a larger share of the people than in any other part of our country. Several thousand Navajo Indians live on their reservation located near where the corners of Arizona, New Mexico, and Utah join. Many Indians support themselves by raising sheep, by selling hand-woven blankets, and by working on the railroads. The Hopis still make their living by raising sheep, and by tending little patches of irrigated corn down in the valleys. They make their homes in interesting villages on the tops



Courtesy "The Journal of Heredity"

Fig. 149. Hopi corn is a dry land plant. Its tops are short and small. Its sprouting stem is so long that it can be planted deep and thus get moisture. The shaded part of this figure shows the depth of earth in a box for testing sprouting ability of different corn varieties. Only the Hopi corn succeeded in very deep planting.



Courtesy Mining and Scientific Press

Fig. 150 A. Sacramento Hill, near Bisbee, Arizona, in February, 1913, before open mining of copper ore commenced. Open mining is done with steam shovels.



Courtesy Mining and Scientific Press

Fig. 150 B. The same hill as in Fig. 150 A, in September, 1920. In sixteen more years the hill will all be gone and its billion pounds of copper will be in use.

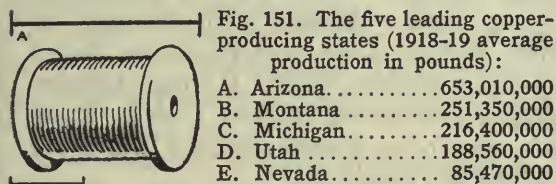


Fig. 151. The five leading copper-producing states (1918-19 average production in pounds):

A. Arizona	653,010,000
B. Montana	251,350,000
C. Michigan	216,400,000
D. Utah	188,560,000
E. Nevada	85,470,000

of high, steep mesas. (Fig. 148.) Hundreds of years ago the forefathers of the

tribe built the villages on mesas because those places were easy to defend against hostile Indian tribes.

In the Mexican part of the plateau a third part of the people are full-blooded Indians; even more are part Indian and part Spanish; and about a quarter are Spanish-speaking white people who rule the country. It is only in the American parts of this plateau that the white people actually outnumber the Indians.

The population is much denser in the Mexican than in the American section. The City of Mexico is larger than any American city between Kansas City and the Pacific Coast. Nine-tenths of the people of Mexico live on this plateau because it is much cooler and more healthful than the hot lowlands near the ocean.

147. Agriculture.—Since rain is so scanty here, little of the land can be cultivated, and

most of it is in sheep and cattle ranches. It is so dry that in many parts fifty or sixty acres of land are required to keep one steer; and much land is required to support one family. Many of the plateau sheep and cattle go to the corn farms to be fattened.

Here and there where water can be secured, little patches of land are irrigated by Indians and white men. The Pecos and upper Rio

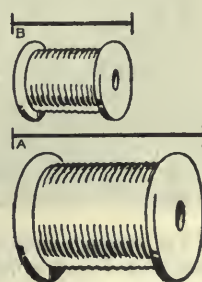
Grandewater many rich alfalfa fields. It is only on the Rio Grande that we find a large storage irrigation system. This is supplied by the Elephant Butte reservoir, situated a short distance above El Paso, and built by the United States Government in 1908. The flood water stored in this lake irrigates the plains around El Paso. Hundreds of farmers now grow crops of grain and alfalfa on land which before the coming of water was only a desert.

In the Mexican section the chief crops, where water can be had, are

corn and beans. Many of the people live almost entirely on the monotonous diet of corn cakes baked over an open fire, and beans seasoned with chile pepper.

Fig. 153. Copper production, 1917, in pounds:

A. World	3,147,258,000
B. United States	1,886,120,721



148. **Mining and transportation.**—Precious metals have long been the chief wealth and the chief export of Mexico. This country is often called the metal storehouse of the world, and nearly all the Mexican metal is in this plateau and the mountains along its edges. The Spaniards conquered the natives because they had such wealth in gold and silver. Metals will doubtless be the chief export a hundred years hence, as they have been for four hundred years past. In the past, silver has been the chief product of the mines, many of which could be reached only by mule trains, which traveled for two or three hundred miles inland from the seacoast over rough paths where wagons could not go. Under such difficulties only the richest ores could be used. Ore was dug out by hand, and carried in sacks on the backs of men who climbed up ladders to the top of the mine. The ore was crushed by the "arrastra," a stone wheel which was rolled on a stone floor. The rolling wheel worked the heavy metal into wide cracks in the floor. After the lighter dust and particles of stone were swept away, the silver was taken out of the cracks with a spoon and carried off on muleback for further refining in smelters.

After American railroads had been built across the Rocky Mountains and the Southwestern Plateaus to the Pacific Coast, lines were extended into Mexico. Mexican lines were also built from Vera Cruz and Tampico over the steep mountain wall into the plateau. Engines, pumps, and efficient mining ma-

chinery from the United States and Europe can now be taken to many Mexican mines, and the output of metal has been greatly increased. There are so many workers in these mines that, except for cattle, there is little food left for export from this part of the country, and some is imported from the United States.

The American part of these plateaus is also rich in metals. Such great deposits of copper have been found in Arizona that this state now produces more copper than any other state, and more than any single foreign country. Bisbee, Globe, and Jerome are three of the larger mining towns where men of many lands have come to do the work of digging metal. Among them we may see white men from the eastern states, native American Indians, native Mexican Indians, Spanish half-breeds, Italians, Greeks, Poles, and many other Europeans, and also a few Chinese and Japanese.

149. **The need for good government.**—The most important question about the future of the Mexican part of this country concerns the kind of government it will have. There has been so much fighting in Mexico that it is difficult to run a farm, a mine, or a school there, or even to live in peace. In New Mexico, government officials are elected by ballot. Across the border, in Mexico, the officials have too often elected themselves with the aid of bullets, because so many of the people are impatient and uneducated. On the American side a man can work and be sure of his liberty and his property. On the Mexican side a mine owner has often said to the *jefe* or magistrate, "I want some men to work my mine."

"All right," the *jefe* has replied.

Then he has gone down the road, arrested the first half dozen poor men he saw, put them in jail, and fined them fifty dollars each. The mine owner has paid the fines, and has made the men work for him to pay him back. This system of keeping a man for debt is called peonage. It is common in many Central American and South American countries.



Courtesy Mexican Embassy

Fig. 154. The Post Office building in the City of Mexico. Many other beautiful buildings are to be seen in the city.

Such injustice has too often discouraged the people of Mexico. Where such things happen, it is easy to understand why there are few schools and few industries of any sort; and why the people are so poor that they must live almost entirely on corn cakes and beans. Mexico needs to learn the art of good government.

150. Unused resources.—

The Southwestern Plateaus, especially the Mexican part, have great resources of silver, copper, and other metals. Some mines have deposits so rich that it will take at least a hundred years to work them out.

The beautiful forests on the highlands and mountains can produce much good timber, if the trees are not destroyed by fire or cleared off for pasture. The pastures of both the American and the Mexican parts are used to their full extent; the forests are not so used.

151. Learning to use the desert.—There is not enough water for much irrigation, but there are some kinds of dry farming which may make large harvests. In parts of Africa which have about the same temperature and the same low rainfall as parts of these plateaus, the land has been made valuable (Sec. 556) by the cultivation of the olive tree (Fig. 437), which has wonderful ability to withstand drought and produces oil good to eat.

The Indians of the plateau region have long eaten bread made of the ground beans of the mesquite, a native tree quite the equal of the olive in its ability to withstand drought. White men do not like to eat mesquite bread, but cattle eat the beans from the trees. In Hawaii the mesquite is an important crop. There the dairy farmers use mesquite bean meal instead of bran and cottonseed meal, which are more costly. There may some day be wide expanses where long rows of olive, mesquite, and other drought-resisting



© Ewing Galloway, N. Y.

Fig. 155. A view over the City of Mexico. The roofs are flat like those in southern Europe. How high is this city above sea level? (Fig. 91.)

trees will stretch across the dry Plateau.

Some of the Indians of New Mexico have shown how dry farming may fit dry lands. They grow a variety of bean that has lived in the dry country so long that it has learned to wait for rain. It will blossom, bear a few beans, stand throughout a few weeks of drought, grow again after the next shower, ripen more beans, and wait through further drought for a third period of production. This way of growing is very different from that of corn and most of our useful plants, which have a short season for fruiting, and then quickly die whether they have produced much, little, or nothing. Man has only begun to make use of the wonderful qualities of many plants.

QUESTIONS

1. How has Nature partly repaid her plateau children for her failure to supply sufficient rain? 2. If your balloon ran away with you, and came down in the Southwestern Plateaus, how would you know you were not in the Cotton Belt? 3. Summarize briefly what you have learned of this region, under the following headings:

SECTIONS.	LOCATION AND BOUNDARIES.	ELEVATION.	CLIMATE.	PRODUCTS.	PEOPLE.	IMPORTANT TOWNS.
U. S.						
Mexican						

4. Make a catalogue from the pictures in this chapter as in question No. 9, page 36.

5. Why do we say the Colorado Canyon is a young river valley, and that the valley of the Mississippi River is very old? (Fig. 147.) How can you account

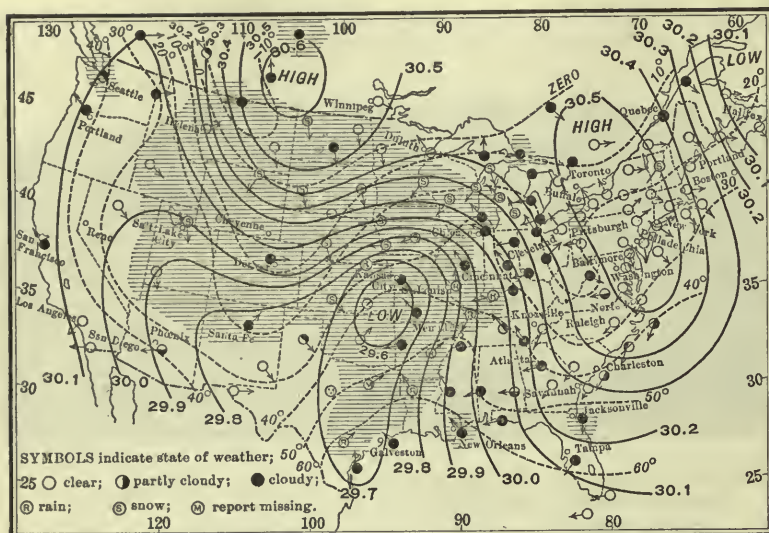


Fig. 156. A United States weather map, showing a big cyclone (low) and a big cold wave (high) on their way across the United States. The shaded area shows where it rained the day before. The temperature (40° at Charleston) is shown by dotted lines. Solid lines show the air pressure (barometer record).

for the difference? 6. Tell the stories of a Navajo and of a Hopi Indian girl. How do they each supply themselves with the six needs of all mankind? 7. Name the irrigation projects (Fig. 130) shown in this region. Is it possible to irrigate much more of this region? What plants will grow here, which may prove valuable to the farmers?

8. Which part of this region would you prefer to visit? Why? Which parts would you prefer not to visit for very long? Why? 9. What effect would a good government have upon Mexico?

THE PACIFIC MOUNTAINS AND THE NORTH PACIFIC COAST

152. The mountain region of the Pacific Coast.—There is not so much plain near the Pacific coast as there is along the Atlantic coast. In many places the coast ranges rise steeply from the Pacific shore. On Fig. 14, examine the mountain system from the southern end of Lower California to the Peninsula of Alaska, and that from Labrador to the Southern Appalachians. Which mountain system has the better natural highways through it? Compare them in height. Locate the Sierra Nevada, the Cascade Mountains, the Coast Ranges. How long is the mountainous peninsula of Lower California? How far is it from Mexico to Canada? from Washington State to Alaska? How long is the south coast of Alaska? These four sections combine to make this long mountain region.

North of the Columbia Basin, the Cascade Mountains and the Rocky Mountains join and form one great mountain mass that continues into Alaska, and finally extends across the sea as the Aleutian Islands. These islands are a string of volcanoes whose tops stick out of the sea.

153. Climate of the Pacific mountains.—As we have crossed the continent in the course of our study we have seen that the weather is very different in

different places. We saw that western Texas has so little rain that the land is good only for pasture, while eastern Texas has so much rain that it is a good place for corn, cotton, and other moist land crops, even for rice, the grain that grows in the water. We found beautiful streams flowing out of the forested Rocky Mountains, and we also found Death Valley, where it is so dry that men die of thirst. How much rain falls in Death Valley in a year? (Fig. 158.) The Pacific mountains also have many kinds of climate, and to understand how this happens we must study more about rainfall.

154. The cyclone and the rain.—What do cyclones do for the western parts of our country? When a cyclone crosses the Pacific Mountains and the plateaus near them, the storm path usually stays near the Canadian boundary. What happens when a cyclone center travels from the Pacific across Washington, Idaho, Montana, and South Dakota? In the United States the wind blows toward this storm center from the west and south. After the wind leaves the Pacific Ocean, it strikes the west side of the mountains near the coast and heavy rain falls on the windward slope of each range.

155. Water vapor.—It is interesting to know why rain falls when the wind crosses a mountain. There is always water in the

air in the invisible form called vapor. Although the air may seem clear, and we cannot see the tiny particles of water vapor, they are there, as there is water in a damp sponge after you have squeezed it.

We have all seen wet clothes hung on a line to dry. The air takes the water out of the clothes, as a sponge or a cloth takes up water into which it has been dropped. If you squeeze the sponge or the cloth, the water comes out. The same thing happens to water that is held in the air, but the way to squeeze the air is to make it cooler. The blacksmith or the plumber will tell you that if you heat a piece of metal it becomes larger (expands), and if you cool it it becomes smaller (contracts). So it is with air. If we heat it, it expands and leaves more room between the air particles for water vapor to slip into. That is why warm air dries clothes faster than does cool air. The air in a room on a hot summer day when the thermometer is 90° F. will hold several times as much water vapor as it does on a winter day when the temperature is only 30°.

156. Dew.—With a glass of ice water we can see how dew is squeezed out of the air. Watch the little drops of water form (condense) on the outside of a glass of ice water in a warm room. Why do they appear?



Fig. 158. Rainfall map of the United States. Find your own home and tell its rainfall. What is the rainfall of the eastern part of Texas? Of the western part of Texas? Parts of Washington State have over 100 inches.

It is because the glass of ice water cools a little of the air that surrounds it, and when the air near the glass becomes cool, it cannot hold as much water vapor as it could when it was warm, so the vapor condenses and forms dewdrops, or drops of water, on the cool glass. The condensed vapor or dewdrops cling to the outside of the glass, and we can see them become larger and larger until at last they run down the side of the glass.

In the same way dew forms at night on blades of grass. The grass cools off quickly and makes the air near by so cool that it cannot hold all the water vapor it has. We say the dew falls. It does not really fall, but it forms right where we see it, just as the moisture condenses on the cool glass. In fact, the moisture that we watch form on the glass is really dew.

157. Frost.—If you will watch the moisture condense on a plate of ice cream in hot weather, you may see some of it freeze into tiny spikes, or crystals, of ice. They are frost—frozen water vapor. Why does frost, instead of dew, form on cold nights in fall and spring?

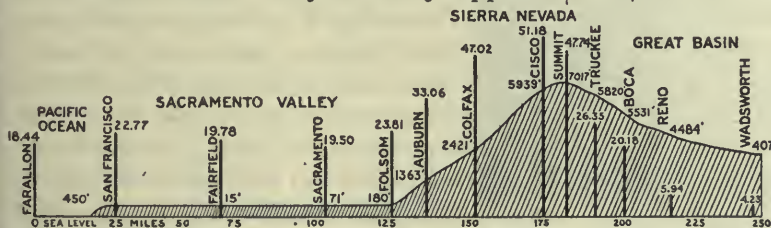


Fig. 157. A cross section of the country from the Farallon Islands to Wadsworth, Nevada, and the rainfall. The heavily shaded part is the land. The elevation of places is shown by figures at the surface of the land; the amount of rainfall per year, by vertical lines and figures at the tops of the lines. Thus Wadsworth has 4077 feet elevation, 4.25 inches of rain per year, and is 250 miles from the Farallon Islands. What do these graphs show you about the relation between the Sierra Nevada Mountains and rainfall. (Sec. 154.)

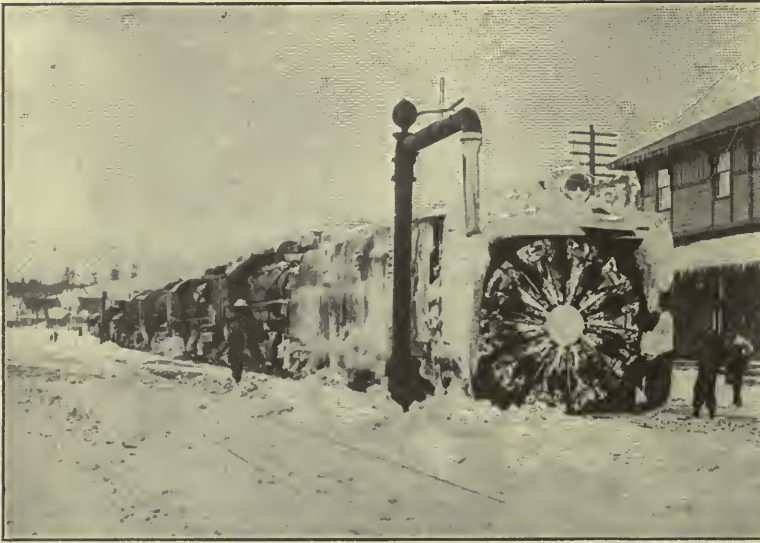
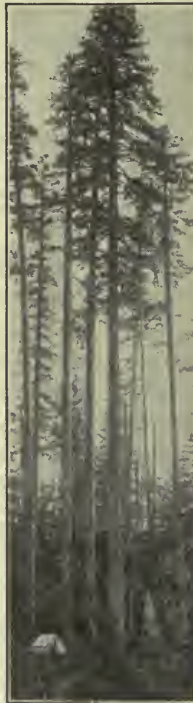


Photo. Brown Bros., N. Y.

Fig. 159. A rotary snowplow used to dig a way through mountain snows.

158. Rain in the western states.—Now we are ready to see why the Pacific Mountains have much rain and snow, while the Basins have so very little. When the west wind blows moist air from the Pacific Ocean toward Nevada, it has to cross two mountain ranges, and one of them is very high. (Fig. 157.) As the air climbs higher and higher it becomes cooler and cooler, and the moisture, or water vapor, condenses as it does in the case of the cold glass or the blades of grass. These little drops of water in the air are like those we see in the little cloud which forms above the mouth of a boiling teakettle. As the air goes higher and becomes still cooler, the little drops gather together making drops so large that they fall as rain. If the weather is cold enough, frost is formed instead, and falls as snow. Look at the rainfall map of the United States (Fig. 158). How many belts of rainfall can you pick out in each of the Pacific States? What makes them? (Figs. 91, 157). How much rain falls in Nevada? How much on the Sierra? Can you get facts from



U. S. Forest Service

Fig. 160. Fir trees, Baker County, Oregon. Did you ever see a tree with so much trunk and so little top? Will these make good lumber?

Figs. 158 and 91 and make a figure like 157 from a line east and west through Seattle or Portland?

Does the rainfall map show why nearly all the towns of Utah are in a string on the plain at the foot of the Wasatch Mountains?

159. Uneven distribution of rain on the Pacific Mountains.—Lower California is so far south that cyclonic storms occur there only in the winter. In summer it is a hot, dry region. There is so little rain that the mountain streams rarely

reach the sea. The rainfall increases as we go north, but even at San Diego there is less than twenty inches of rain a year, and men must irrigate the land in order to grow most crops. But in northern California, Oregon, and Washington, the west winds drop nearly a hundred inches of rain a year on the mountains. The winter snowfall is heavy. Sometimes it is piled up to the eaves of mountain houses. The railroads can run only by having snowsheds built over the tracks. At Donner, California, near the summit of the Sierra, the average snowfall is sixty-eight feet a year.

From the northern end of Vancouver Island around to the Alaskan Peninsula, the Pacific Coast is in many places a rugged wall of mountain, rising so directly from the sea that rarely is there room for a town or a farm (Fig. 165). The sea winds hurl moist air, warm from the ocean, against these mountain slopes. This causes very heavy rain and snow. So much snow falls on the high mountains that glaciers bring millions of tons of ice down to the sea, where it melts in the warm water of the Japa-



Courtesy West Coast Lumbermen's Assn.

Fig. 161. Splitting a Sitka spruce log for airplane wood in western Washington. Can you tell why split pieces may be stronger than sawed pieces? Men cut the tree in a day. It needed three hundred years to grow.

nese current (Fig. 327). Because of this current the temperature along the Alaskan coast is much warmer than that of eastern North America in the same latitude.

160. Forests and snowfields.—In Lower California the climate is so hot and the rainfall so slight that there is only a little forest on the top of the high mountains near the northern end of the peninsula. The mountains are often only bare, dry rocks, with a few bushes clinging in the moister places.

The forest begins at 5000 feet on the mountains of southern California. The valleys are treeless. In the Great Valley the western slopes of the southern Sierra Nevada are grass-covered for the first fifteen hundred feet, then scattering trees appear. At three thousand feet the Sierras are covered with a solid forest of splendid trees, which extend upward to the 6000-foot level. The farther north one goes the greater is the rainfall and the lower this forest line on the mountains. The Coast Ranges, which are lower than the Sierra, do not have much forest south of San Francisco. What is the rainfall of the Coast Ranges? (Fig. 158.) In northern California, Oregon, and Washington the heavy rain makes the coast forest so thick that it seems almost like a great dark building beneath the trees. The great tree trunks stand like the columns of a temple. Between them stand masses of

ferns as high as a man's head, and in winter they are dripping wet in this ocean climate.

Large areas of these Pacific forests are covered with redwood, sugar pine, and Douglas fir. The Sitka spruce flourishes in the wettest lands along the coast from Oregon to Alaska. Its wood became so important during the World War, when it was used for making parts of airplanes, that special railroads were built in western Washington to get out the great logs of this strong, light wood.

No other part of the world can rival the mountains of the Pacific Coast in richness of lumber supply. One may walk for miles along mountain slopes in California, Oregon, Washington, and British Columbia, winding his way in and out among the trunks of trees that are four, five, six, or seven feet in diameter. The first limb of these trees may be fifty or even a hundred feet from the ground. Nowhere else in the world does one acre of forest yield so much lumber. (Fig. 160.)

It is on the west slope of the Sierra that



Courtesy The H. K. McCann Co.

Fig. 162. Felling a Pacific Coast tree. Why may this be called "mining" lumber? About how old is this tree if it has added one quarter inch to its diameter each year?



Fig. 163.

we find the famous "big tree" or giant Sequoia. Millions of years ago these trees were very common; now they grow only on a few hundred square miles of this region, and the largest trees are now in a park. (Sec. 163.) The mild winters, the plentiful rain, and the absence of hard winds permit these ancient giants to prosper. Some of them have lived since the time of Moses.

161. From the forest to the lumberyard.—Since lumbering is the chief occupation of this region of wonderful mountain forests, most of the population is made up of lumbermen. Here in the woods they live for a time in camps and work, busy with temporary railroads, log chutes, timber flumes, donkey engines, and teams. Washington State leads all others in lumber production; Oregon is third. The lumber is sent by thousands of carloads to eastern cities, and by shiploads to every continent.

162. Forests of the northern mountains.—The splendid forest that we find in Washington extends on into British Columbia and Alaska. Most of the

Alaskan shore and many steep islands, including Kodiak Island, Alaska, are at low elevations, green with forests of Sitka spruce and other evergreen trees. In this northern latitude the upper timber line is not high up. Above it are thousands of square miles of bare rocks or snow-

fields, from which come the glaciers (Sec. 159).

This Pacific Mountain Region includes Mt. McKinley, Mt. Logan, and Mt. St. Elias, the highest mountains of North America.

163. National forests and national parks.—Since nearly all of this mountain region is

too rough for farms, our Government has very wisely set aside much of the American part of the land as national forests, to be protected by the forest rangers, and to be kept for the use of all the people for all time. In summer, sheep are allowed to pasture in some of the forests as they do in the Rockies. Lumber is cut to meet the needs of the people who live near, but the Forest Service tries to keep young trees growing, so that the forest may always yield a harvest. The art of protecting and caring for forests is called forestry.

Many of the most beautiful parts of the Pacific forests have been set aside as national parks. Roads have been built which lead to them, and travelers may go to them to camp, tramp, and

enjoy the wild out-of-doors. (Figs. 128, 168.) Many citizens have spent much time, working without pay, persuading Congress to pass good forest and park laws, and our Presidents to enforce them. Public-spirited citizens had to work very hard to get a grove of the largest of the Sequoia trees set aside



Courtesy U. S. Forest Service

Fig. 164. A forest fire killed these big trees in one of our western national forests, and left them standing. Later a second fire killed the young growth and burned deeply into the old dead trees. Compare the value of this stand of timber with that shown in Fig. 160.



Photo. William Thompson

Fig. 165. Pyramid Range, Sitka Harbor, Alaska. Why is the bottom forest-clad, the top snow-clad, and the mid-height cloud-clad as the west wind blows? Rivers on this coast are salmon streams.

as Sequoia National Park. The wonderful Valley of Yosemite, on the Merced River in California, is now the Yosemite National Park.

In Oregon, a road eighty miles long permits the traveler to visit Crater Lake, famed for its high cliffs and clear water of matchless blue. This lake is five miles across and stands in the top of an old volcano, where once the lava boiled and bubbled. In western Washington is Mt. Rainier National Park, where snow-capped Mt. Rainier can be admired from great distances. The government of British Columbia has set aside national forests and national parks as our government has done in the United States and Alaska.

164. Minerals.—This mountain region has another source of wealth: minerals. Gold was first found in California in one of the streams of Sacramento Valley, in 1848. The early miners washed the sands of the rivers in pans. To get the golden grains, they even scraped with spoons the crannies in the rocky beds. After the miners had taken all the gold out of the stream bed, they found that small quantities of gold could still be washed from banks of sand and gravel lying along the streams, by a method called placer mining. Finally the miners followed the precious trail up to its ancient source in the mountain rocks. There deep mining in the

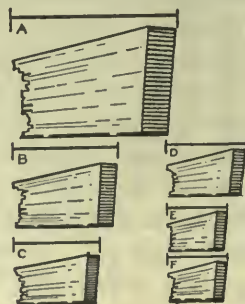
solid rock began. In some places valuable orchards have been torn up by dredges digging up meadows to get gold from ancient river beds. The meadow becomes a pile of stones.

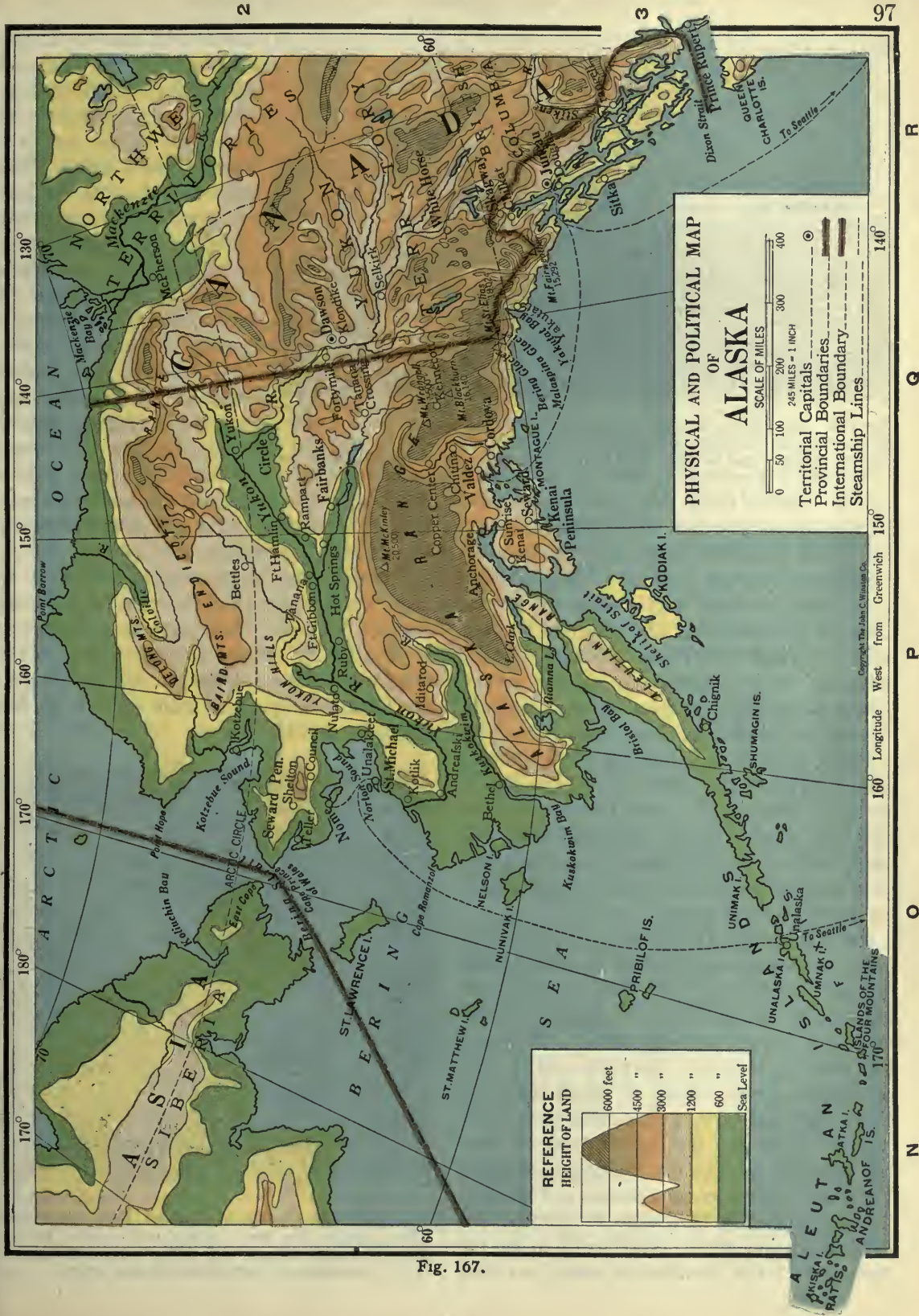
There is gold in the Alaskan part of these mountains also. At Juneau is the famous Treadwell gold mine, where there is an enormous mass of ore, yielding only a little gold per ton, but enough to pay men for working it. This mine has produced many millions of dollars worth of gold, and the ore that remains will produce many millions more. The coast here is so steep that it is difficult to find room enough for the houses of the small town, so some of them have to be perched up on the rain-drenched hills.

165. Railroads and cities.—Southern Alaska has deposits of copper and coal, and the United States Government has built a railroad to help the mining industry. In summer the terminus of this road is at Sunrise,

Fig. 166. Six leading lumber-producing states (1919):

- | | |
|----------------|---------------------|
| A. Washington | 4,961,200 ft. B. M. |
| B. Louisiana | 3,163,900 ft. B. M. |
| C. Oregon | 2,577,400 ft. B. M. |
| D. Mississippi | 2,390,100 ft. B. M. |
| E. Alabama | 1,798,800 ft. B. M. |
| F. Arkansas | 1,772,200 ft. B. M. |







Courtesy Seattle Chamber of Commerce

Fig. 168. Mt. Rainier, sometimes called Mt. Tacoma, 14,408 feet high, called by the Indians "The Mountain That Was God." It is not far from Puget Sound, Tacoma, and Seattle. The tents are those of campers, who have the privileges of the mountains, which are part of Mt. Rainier National Park.

near the head of Cook Inlet, but when the inlet freezes over in winter, the trains must cross the Kenai Peninsula to the port of Seward.

Skagway, at the head of a long, narrow inlet, has a railroad that crosses the mountains to connect with the steamers on the upper Yukon at White Horse. These steamers carry supplies to mining settlements and trading posts on the great Yukon. We shall study about them later (Sec. 348).

Prince Rupert, at the mouth of the Skeena, will probably be the largest city of this region north of Vancouver. It is the terminus of the new Grand Trunk Railroad that has been built by the Canadian Government to give the northern part of the wheat region an outlet on the Pacific.

166. Preparing for the future.—These mountains reach from the land of blazing sun to driving snow, but everywhere they are mountains, producing only pasture, wood, minerals, water, or recreation. They are not suitable places for the permanent homes of many people. Most of those who live there stay only for a time, and then move away. They are lumbermen, miners, forest rangers, or campers seeking a summer vacation in the cool mountains. (Fig. 168.) Though men live here only temporarily, it is the intention of the Government to use the resources of the mountains wisely, so that

people will receive future benefits. In the national forests the ranger fights fire, in order that people may have wood to use ten or a hundred years hence. The parks are planned to last forever. Water power plants are being built along-side of mountain waterfalls in order to send power to Seattle, San Francisco, and dozens of other cities. These power plants and irrigation reservoirs are being built with the future in view, because they must run for many years before

they can pay for themselves, and they can keep on furnishing water and power to valley dwellers for generation after generation.

These Pacific Mountains have almost as much water power as all the rest of the United States combined. They have as much power as is used by all the factories east of the Mississippi River. Some of this power is in the Coast Range, but more of it is in the Cascades and the Sierra. All of it is within

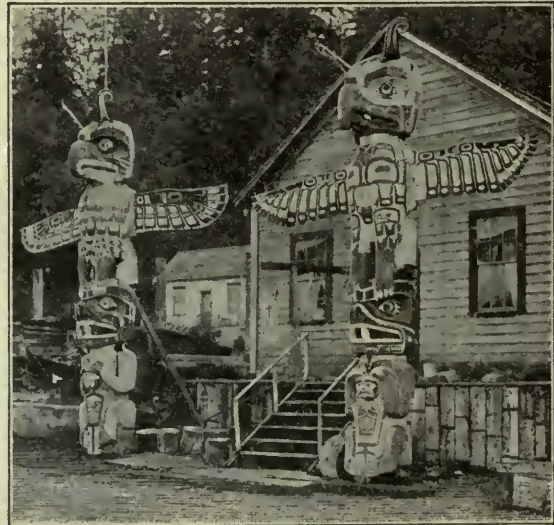


Photo. Wm. Thompson

Fig. 169. This Indian on Albert Bay, Vancouver Island, builds his house white man's style, but he tells his family history with totem poles carved from tree trunks, North Pacific Indian style.

easy reach of the cities of the valleys and the coast and the Basins.

If we take proper care of our continent, we shall keep these mountains in forest to furnish wood, to hold the soil, to store water in the soil, and to shade the snow so that it will not melt too soon. In many of the narrow canyons, dams will some time be built to provide water for irrigation and electric power. Show one way in which waterfalls are better than coal fields.

167. Alaskan resources.—The mines of Alaska promise to yield large quantities of coal, copper, and gold; they may keep many thousands of workmen busy for a long time. Salmon canneries at river mouths along the coast will continue to be busy in the canning season; that is, if we do not destroy the salmon by too much fishing, as we have done in some other rivers. On the Pribilof Islands in Bering Sea our government owns and cares for the largest herd of fur seals in the world. The men who live there to protect the seals also have fox farms, where they raise the blue fox for its valuable skin.

There is some farming land along the Alaskan coast waiting for the time when we may need to use it. Grass grows to great height. The long summer days let potatoes, oats, barley, and many hardy vegetables ripen.

The forests of the Alaskan coast region contain a vast amount of timber, and will soon be of use. In 1921 the United States Forest Service leased a large tract of land in a national forest near 56° north latitude to a paper company which promised to build a large paper-mill at once. Who will use that paper? How will it reach the market?

The interior, with its maze of unmapped mountains, offers attractions to daring persons who like to join the Indians and tramp where few have tramped before; who like to fish and to hunt mountain sheep, caribou, and grizzly bear, far from the homes of men.

168. The conservation of resources.—These mountains will be one of the tests of our government and of our civilization. In some parts of Spain the firewood cutters

went out long ago and cut down the trees. Then the goatherd came along with his flock, and every little tree was eaten. Then gullies started and now they are deep enough to hide a house. Nothing grows on those mountainsides and no one makes his living there.

In parts of China the same thing has happened. The forest is gone from the mountainside, the earth is gone from the mountainside, and even worse yet, the dirt and stones have been spread over the good farm lands of the valley and have ruined the valleys also.

Shall we do better than this? In some places we have already done the same thing in our new continent. (Fig. 82.) Most of our western mountain lands belong to the government. Shall we elect to government positions people who work for the public good, and then keep them in their positions? In a very short time that choice of officials for such positions will be made by the boys and girls now in our schools. What organizations are there in your neighborhood that work to make it a better place in which to live?

QUESTIONS

1. Determine with your map scales the length of this great mountain wall. (Sec. 152.) What states and provinces does it cross? Locate and give the elevation of four great mountain peaks. What important mountain ranges form the system? 2. Make a list of the good effects of mountains; the bad effects. 3. Will it make any difference to the people of a city on the Atlantic Coast if fires and lumbermen waste timber on the Pacific Mountains? 4. Give three reasons why these mountains should be kept in forest.

5. Why is there more rainfall in the northern part of this region than in the southern? 6. Why should the governments of the United States and Canada, rather than private individuals, own great areas in these mountains? 7. Compare the west coast of North America and the east coast as to nature of coast line, width of coastal plain, distance of mountains from the sea, average height of mountain areas. 8. Write to the National Park Service at Washington for a booklet about the national parks. 9. What appeals to you as the most beautiful sight one would see traveling through this region? the most interesting?

10. How may the waterfalls in these mountains do as much for the people who live there as anthracite has done for Pennsylvania? 11. Subject for debate: Resolved, that the forests of our country are a greater source of wealth than our gold mines. 12. Find from some good encyclopedia, facts of interest about the Yosemite, Mt. Rainier, Crater Lake, the big trees of California.



Fig. 170. Looking down from Smiley Heights upon the orchard-clad slopes above Redlands in the southern California orange district. Compare with Figure 1. Can you tell why a lot of snow on the mountain in the springtime makes the valley people feel rich.

THE VALLEYS OF THE PACIFIC COAST

169. The four Pacific valley regions.—On the Pacific slope there are four valleys, each of which is separate from all the others. The four valleys differ greatly in character; so much, indeed, that each of them must be considered as a separate region. Two of these valleys are in California; one is in Oregon, Washington, and British Columbia; and the fourth, which this chapter describes, lies near the mouth of the Colorado River north and east of the Gulf of California, in Mexico, Arizona, and California.

THE LOWER COLORADO REGION

170. A great delta oasis.—The lower valley of the Colorado River is often called the American Egypt. This so-called American Egypt is naturally desert, but a great river flowing from other regions makes the land productive in much the same way that the Nile River saves Egypt from being a desert. The climate of the two regions is similar, and crops such as the date, Egyptian cotton, alfalfa, Kafir corn, and early vegetables are produced in both places. The

people of Yuma, Arizona, sometimes say that they have eleven months of summer and one month of late spring. How far north of the equator is Yuma? Cairo on the Nile?

171. A wonderful delta.—The Colorado delta is a piece of new land. It is much the largest tract of good farm land in this region. Once upon a time, long ago, the Gulf of California reached about two hundred miles farther to the northwest than it now does, and the Colorado River flowed into the east side of it. The dirt that the river cut from the Grand Canyon was gradually spread out into a delta that reached across the Gulf. The river, as rivers do in deltas, flowed now here, now there, sometimes into the gulf as at present, sometimes into a cut-off piece of the Gulf, the remainder of which is called Salton Sink or Sea. (Fig. 171.) When the Southern Pacific Railroad was built through that region, and white settlers began farming there, the Colorado flowed directly into the Gulf, and the Salton Sea was so nearly dried up that it was only a small body of salt water surrounded by many square miles of

desert land lying below the level of the sea. How much is below the sea level? (Fig. 171.)

172. A fight with a river.—Imperial Valley is the correct name for the American Egypt. The Americans built a canal to carry water from the river toward Salton Sink, to irrigate the rich delta land. By accident they nearly drowned the valley. Heavy floods made the water flow so swiftly that it dug the canal deeper, and finally 87 per cent of the Colorado River flowed down into Salton Sea. New channels washed good fields away. The sea rose and flooded the railroad and some farms. How much land would it have flooded if it had not been stopped? (Fig. 171.) It took three million dollars and many months of work to stop this break and make the river flow again into the Gulf. Many miles of railroad bed were under water when the river was conquered, and many farms were threatened. Now a great farming region has arisen there, for the soil is level, rich, and deep, and the hot sun makes plants grow with great speed.

173. Date farming.—The Arabs say that

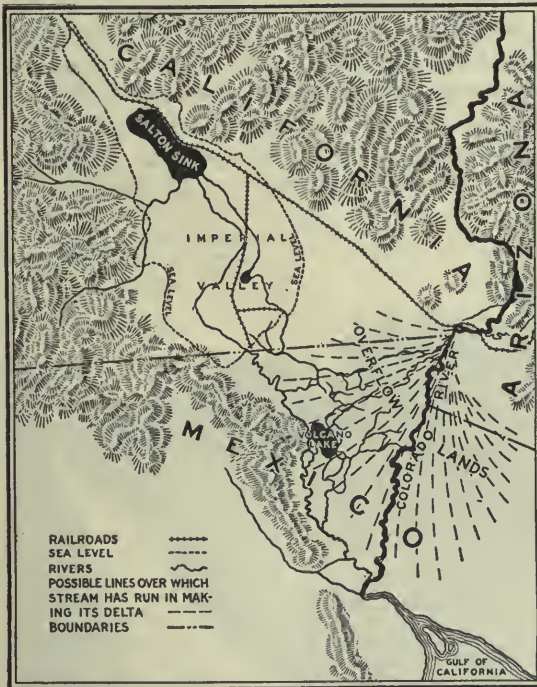
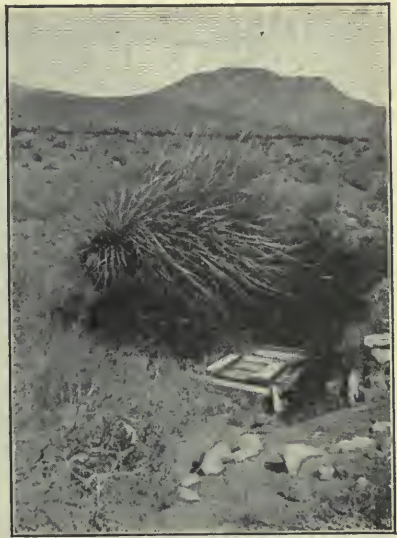


Fig. 171. Map showing the delta (alluvial fan) of the Colorado, and the Imperial Valley which it made. Where was the upper end of the gulf before the delta reached across it? California has many such alluvial fans.

their great food tree, the date palm, loves to grow with its feet in the water and its head in the fires of Heaven. Then the Imperial Valley is a natural home for the date.

The great river furnishes plenty of water, and the rays of the sun do seem almost



Courtesy U. S. Geological survey

Fig. 172. A desert in the Lower Colorado Region. The only water within ten miles is under the boards beside the bush. • No water flows away from the spring. Many such springs have been marked by the United States Government to make the desert safer for travelers. Can you tell why travelers might cross this desert?

as hot as fire. The thermometer is 105° in the shade every day for weeks at a time, and if the sun shines on a pipe filled with water, the water in it will get hot enough to burn one's hands. Orchards of date trees, brought from Africa and Asia, are now thriving and bearing good fruit in what was recently the burning desert of California and Arizona. It is claimed that these dates are sweeter and better than old-world dates.

174. Truck farming. — Cantaloups from this district ripen weeks before those grown on the Atlantic Coastal Plain. For a month they are shipped (three hundred carloads a day, in 1920) to nearly every state in the United States. Sometimes the price is high, but sometimes there are too many cantaloups grown, and the price drops so low that it does not pay the growers to ship them.

175. Cattle and cotton.—The Imperial Valley and the Salt River Valley are also good for cattle. No crop thrives better under irrigation than alfalfa. This forage, along with Kafir corn (Sec. 108), is grown and fed to many dairy cattle; so there is butter to sell.



Courtesy W. L. Paul, Coachilla, Calif.

Fig. 173. A date garden thirteen years old at Coachilla, California, a short distance from Salton Sink. Each year the tree drops some leaves and gets taller but not wider.

The United States Department of Agriculture tried experiments with Egyptian cotton, and now many thousand acres of this cotton are grown each year in the Imperial Valley, and in the Salt River Valley, near Phoenix, Arizona. This productive valley, once desert, now has a rich agriculture much like that of the Imperial Valley, since it has been irrigated by the waters from the famous Roosevelt dam. (Fig. 130.)

All of the cotton now grown in this valley has come from the seed of one extra fine Egyptian cotton plant that grew there in 1910. Because this cotton has such long fibers, it is used for automobile tires, and sells for a big price. The Salt River Valley produces good oranges, grapefruit, and olives.

Many of the farm laborers in this region are Japanese, Mexicans, and Indians. They seem to endure the hot climate better than can white settlers.

176. The east coast of

the Gulf of California.—This is a low plain with steep mountains at its eastern limit. This coast plain shimmers under the blazing sun and, like the lower Colorado Valley, is nearly rainless and often bare. (Fig. 172.) In some parts there is so little rain that no streams reach the sea. They flow instead into little salt lakes or salty sand plains. Even the mountains for the first four or five thousand feet up are hot, and bare of all growth except cactus and scattered desert bushes. Pine forests, encouraged by the greater rainfall of the heights, cling to the high, wild slopes. The white man knows but little of these tangled masses of mountainsides and hidden valleys, but the Indian has climbed there. Some of this wild region is still occupied by the Yaqui Indians. This brave tribe has been at war with the Spanish-speaking people of Mexico for three hundred years.

An American railroad has been built the whole length of the plain and it extends on up into the plateau. (Fig. 91.) At a few places there is enough water for irrigation, where food crops for the natives, and a few early vegetables for the American market are grown. About Christmas time some tomatoes come into the United States from this frost-



Courtesy The Southern Pacific Ry.

Fig. 174. Irrigating young date palms, Imperial Valley, near a boundary town called Calexico. What is the man doing with the shovel?

less land. The chief freight for the railroad is the minerals, which are sometimes brought down several days' journey on backs of mules from mines in the mountains.

177. **Unused resources.**—Much water can be stored in some of the gorges of the Colorado and its branches, and in the gorges of the rivers in the Mexican mountains. Great canals can lead this water out to irrigate the lowlands of the United States and Mexico. If this is done, the American Egypt will be one of the four great oases of the world. The other three are Egypt, Mesopotamia, and the upper Indus Valley. If fully used, this region will also be a land of mines where minerals can be found; and of ranches, where the pasture, though scanty, will be sufficient for sheep and goats.

A great deal of water power can be developed along the Colorado River.

QUESTIONS

1. Name the chief products which the valley produces. How may these be increased? 2. How may the Colorado River be said to have built the Imperial Valley? 3. Why is the Lower Colorado Region considered a separate region from the southwestern plateaus and mountains? 4. Give reasons for two of the names applied to this region: (a) The American Egypt; (b) The Imperial Valley. 5. What is the annual rainfall for this district? The average temperature for January? for July? (Figs. 328, 329.) 6. Compare its latitude with that of Egypt? How has the Roosevelt dam made last year's rain useful to the farmers in Salt River Valley?

7. Catalog the pictures in this chapter as follows:

TITLE.	DESCRIPTION.	WHAT IT TELLS ME.

8. Compare the Colorado and Mississippi rivers as follows:

NAVIGABILITY.	SCENERY.	UTILIZATION OF WATERS FOR	
		POWER.	IRRIGATION.

9. Describe the journey which the Imperial Valley cantaloup must take to reach your town. Could it be shipped through the Panama Canal to New York? 10. In what way has the growth of cotton in the Colorado Basin lessened the cotton imports of the United States? 11. Why was this good farmland so long unused?



Fig. 176. Southern California.



Photo. Putnam's Studios

Fig. 175. Eucalyptus trees near Pasadena. These swift-growing Australian trees are only 20 or 25 years old. They are wonderful wood producers.

THE VALLEY OF SOUTHERN CALIFORNIA

See on the map, Figs. 91 and 163, how this region lies in the southwestern corner of California, in a kind of hollow made by the mountains as they bend westward toward the seacoast. How high are the mountains that form the eastern and northern boundaries? Would they be more valuable to this rather dry valley if they were twice as high. (Sec. 158, Fig. 157.)

178. **Bounds and surface.**—This region consists of a narrow coast plain and several valleys, of which the largest is the Los Angeles-San Bernardino Valley.

This is the smallest district we have studied, but it has more people than several districts of larger area. The population of the city

of Los Angeles alone has reached 576,673 (1920 census), ranking tenth among the cities of the United States. Pasadena has 45,344, and San Diego 74,683 people.

179. **Climate and scenery.**—Why are there so



Courtesy R. G. Dun & Co., N. Y.

Fig. 177. Getting ready for a photo-play at the Triangle Big Ranch in the Santa Monica Mountains near Los Angeles. Where may these films be used?

many people in this small region? The reasons are two: climate and scenery. The people like to speak of their country as a land of delightful climate and of beautiful landscapes. The ocean winds are so warm that frost is rare in the coast district. In the summer these sea winds seem cool because the land is warmer than the water; in winter they seem warm because the water is warmer than the land. (The temperature of land near the seacoast is usually pleasant.) At night it is so cool, even in summer, that people sleep under blankets, or even enjoy sitting by a fire. But only a short distance inland the summer temperature sometimes reaches 100°. From 1875-90 (9496 days) there were at San Diego 9181 days with the temperature not above 80° nor below 40°.

180. Climate and occupations.—Wonderful climate is the chief resource of Southern California, for climate makes possible the three great occupations of the region: the growing of fruit and vegetables; the

search for health and pleasure; and the making of moving-picture films. Many thousands of tourists go to Southern California each winter to escape the blizzards and snows of the northern and eastern sections of the United States, and to enjoy the beautiful scenery. Many other thousands go to live there permanently. Recently the people who had moved from Iowa to Southern California met together for a picnic near Pasadena, and twenty-seven thousand persons attended. Many such picnics could be held by those

who have moved there from other states.

In this region one may see orange groves, blooming roses, fields green with grain and alfalfa, and in the distance mountains with pine trees on their slopes and glistening snows upon their summits. The warm Pacific near by invites to bathing and boating, and to journeys by boat to Santa Catalina and other islands near the coast. It is no wonder that so many people go to California to improve their health and to have a good vacation.

181. The moving picture industry.—Man-

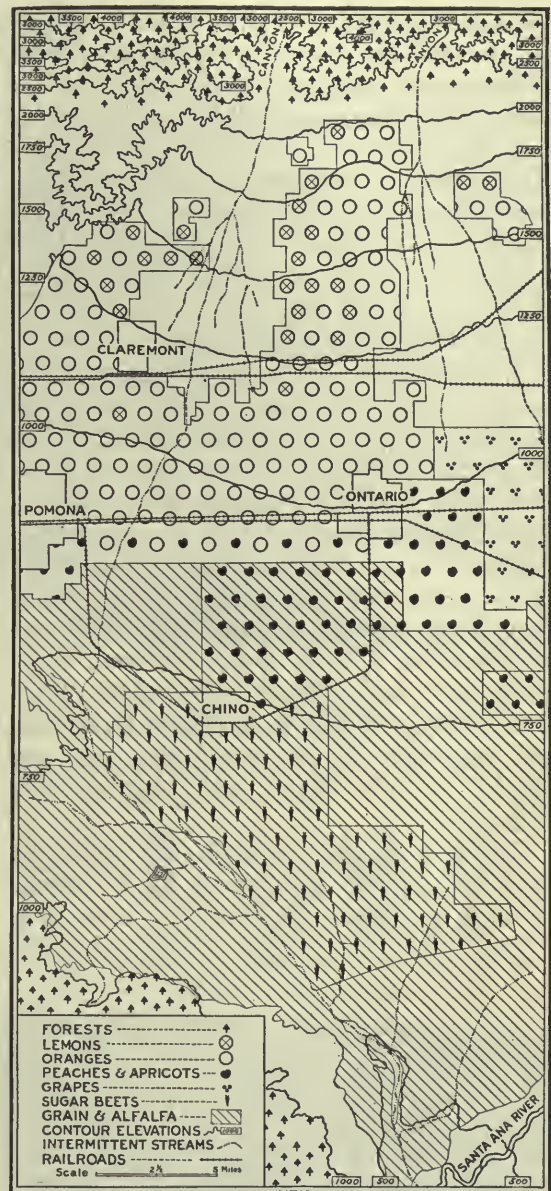


Fig. 178. A view of part of the harbor of Los Angeles.

ufacturers of films for moving pictures have found that the pleasant climate and beautiful and varied scenery of Los Angeles and vicinity are ideal for their enterprise. The seashore, cities, palm trees, orchards, farms, hills, and mountains furnish suitable backgrounds for almost every kind of scene that can be needed. Thousands of people in or near Los Angeles are engaged in this industry, and almost every moving picture theater in the United States shows films made in this locality.

182. The winter rains.—It is a misfortune of this region that the rain falls chiefly in the winter and not at all for three months in summer. Why does it so happen? During the winter, the land is cooler than the sea, and the sea wind, cooled by coming to the land, drops some of its moisture as rain. (Secs. 155, 158.) This fact causes the rainy season, which begins in November and continues until April. From April to November the land is warmer than the sea. The sea wind is then warmed as soon as it strikes the land, and thereby becomes a drying wind instead of a rain-bearing wind (Sec. 155). For weeks and months at a time in summer, the sun shines and there is rarely a shower. Compare Figs. 180 and 89. The dust flies and settles everywhere, even on the leaves of trees. Fields become brown, except where water can be had for irrigation. Irrigated spots make patches of bright green in the brown land. On the higher slopes of the mountains, enough rain and snow fall to keep some forests growing. (Sec. 160.)

183. The struggle for water.—The climate is so good for oranges, lemons, and other valuable fruits that growers make a great effort to get water. If water can be had, an acre of bare land worth only \$100 can be made into an orchard worth \$1500 or \$2000. Water! Water! Water! Everything depends upon getting it. Deep wells are dug and long tunnels are driven back into the hillsides, and the water thus captured from streams far beneath the surface is pumped to the places that need it. To keep the water from soaking into the earth before



Courtesy Prof. Chas. F. Shaw, U. of Calif. and U. S. Bureau of Soils
Fig. 179. Map of a section of valley near Pasadena, showing how streams flowing from two canyons have built up a wide-reaching alluvial fan with gentle slopes (Sec. 194) good for frost drainage (Sec. 184) and irrigation. The lines with figures (contour lines) show the elevations. What is the elevation at the Santa Ana River? at the highest lemon orchard? Crops are in three bands: beets, grain, and alfalfa, the most frost-resistant, are at the bottom; then peaches, apricots, and grapes; and finally oranges and lemons. The rough mountain on both sides of the valley is in national forests.

it reaches the trees, it is often carried in pipes or in cement-lined ditches. Great sums of money have been spent to build

the dams, ditches, and pipes needed, but the large crops make it profitable.

184. Frost drainage or thermal belts.—To grow oranges in this region two things not easy to get at the same place are required. One is frost drainage of the uplands, and the other is irrigation of uplands. Frost drainage is a curious part of the climate of hills and mountains. On cold nights, when there is no wind, the coldest air, being heaviest (Sec. 66), runs down into the valleys, which thus get colder than the hillsides above. If the valley does not have time to fill up with freezing air before sunrise, the hilltops and higher slopes do not freeze. A place having frost drainage is sometimes called a thermal belt. It does not reach very high up the mountainside. As the hillsides and hilltops are safer from frost than the flat valleys below them (Fig. 179), many orchards in Southern California and elsewhere in the world (Sec. 283) are planted on the slopes and tops of hills (Fig. 244).

Orchards on the slopes in dry countries must be supplied with water by irrigation. With much labor, ditches have been dug

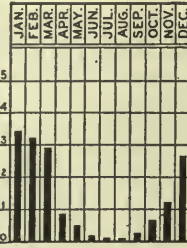


Fig. 180. Rainfall of Los Angeles, Calif., 15.62 inches per year. Californian-Mediterranean type.

which carry water out on the Southern California slopes, where orange groves bedeck the foothills on both sides of the San Bernardino Valley as in Fig. 179. Below on the floor of the valley, instead of fruit trees there are fields of alfalfa, wheat, barley, and other crops that frost does not injure. Where the foothills cannot be irrigated, grapes are sometimes grown, because the vines are able to send roots far

into the earth, and thus they get the small amount of necessary water.

185. Very intensive agriculture.—Agriculture is more intensive in this district than in any other region of the United States. Many families support themselves by selling the oranges, peaches, grapes, tomatoes, celery, cabbage, or vegetables which they grow on five or ten acres of irrigated land. In some localities the sugar beet is grown. This crop requires much work, but it gives a large harvest. The farms are so small that the farmhouses are close together. As one rides along the road, one seems to be passing through a village which extends for miles, but really the buildings are just a succession of farmhouses.



Fig. 181. The view from the top of Mount Lowe, California. Los Angeles is in the foreground and the Pacific Ocean in the distance.

186. The fog and the beans.—Near the seacoast there is a heavy fog every summer morning for weeks at a time. Foggy weather seems to suit lima beans, and nearly all the beans that are dried and sold in the United States are grown in this district. The rainfall is only ten or fifteen inches a year, but the beans grow without irrigation because the fog dampens the ground each night.

187. Hillside pastures.—Flocks of cattle, sheep and goats pasture on the slopes above the irrigation line, and above the pastures the mountainsides are clad with forests of oaks and evergreens.

188. The need of forests.

—The people of these valleys insist that the Government shall keep all mountain summits well cared for and forest-clad (Sec. 168), so that there may be water for irrigation.

189. The Los Angeles aqueduct.—Years ago the people of Los Angeles found that the city must have a new and larger water supply. This supply was secured at great labor by building an aqueduct through mountains and over hills, valleys, and plains, in order to bring water from Owens River near the foot of Mt. Whitney, in the Sierra Nevada Mountains, two hundred and forty miles away. (Fig. 182). This new water supply is one of the things which has helped the city to grow so rapidly. Hydroelectric power plants have been built at points where the aqueduct comes down the mountainsides. The power is sold in cities to help repay the twenty-five millions of dollars spent in building the aqueduct. (Fig. 194.)

190. Fuel and cities.—There is so little coal on the Pacific Coast, that ships coming to California for grain formerly brought coal from our Atlantic Coast, from Australia, and even from England. Then petroleum



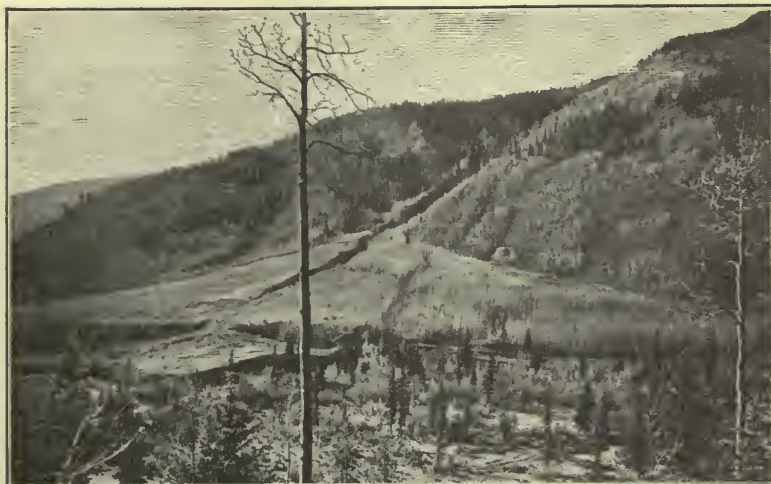
Photo. Jas. N. Bledsoe

Fig 182. Los Angeles water-supply aqueduct crossing a deep valley. What does the picture tell you about the rainfall of this region? What does the small picture tell you about the size of the steel pipe?

fields were found in Southern California and in other parts of the state. (Fig. 44.) This oil is a much cheaper fuel than the coal that was imported. It is used instead of coal on Pacific railroads and many steamships and United States Government war vessels. The manufacturers in Los Angeles can now run engines as cheaply as they can be run near the coal fields of the eastern states. This is one of the reasons why Los Angeles grew more rapidly between 1910 and 1920 than any other large American city except Detroit. Los Angeles is the trade center of this region. It has a good harbor, steamship lines on the Pacific, and is growing as a manufacturing center.

191. Future.—Much more land may be irrigated by preventing all waste of water. What was said in the study of the Southwestern Plateaus (Sec. 151) about crops that grow on unirrigated land?

Will the delightful climate of this section continue to attract people from other regions? What does the success of the film industry indicate as to the future of other manufacturing industries?



Courtesy U. S. Geological Survey

Fig. 183. The low fan-shaped hill, spreading out from the foot of the gulch, is an alluvial fan covering a few acres. It was built up of soft, rich earth washed out by the water flowing from the gulch or canyon. Alluvial fans miles across are shown in Figures 171 and 179. Can you find them? The sides of the Great Valley in California are a long series of wide fans reaching outward from the mountains. Millions of people live on alluvial fans.

QUESTIONS

1. Would you prefer to winter in Southern California or in Florida? Give your reasons. 2. Imagine that you are an actor or an actress in a moving-picture company in Los Angeles. Write a letter to a friend in the east, telling of your work, and of the advantages which this region offers for the taking of moving pictures. Is it better for this purpose than Florida? 3. Make use of the following chart to explain the importance of Southern California:

HOW NATURE'S HELPERS AID THE PEOPLE OF SOUTHERN CALIFORNIA.

NAMES OF HELPERS.	How EACH HELPS.
The Ocean.....	
The Mountains.....	
The Mountain Streams..	
The Mountain Snows...	
The Mountain Forests...	
The Weather.....	
The Soil.....	

4. What effect has the Panama Canal upon the commerce of Southern California?

5. Account for the difference between the climate of Southern California and that of the Imperial Valley.

6. Compare the reasons for planting trees on the hill-sides in California with the reasons for planting trees on the hill-sides in the Ohio Valley. 7. If the mountain wall to the east were no higher than the Appalachians, what would be the conditions to-day in Southern California? 8. How many ways can you think of by which neighboring regions might help people to make a living in California? 9. How does California pay these neighboring regions? 10. Which region is benefited most?

THE VALLEYS OF CENTRAL CALIFORNIA

192. A large valley and four smaller valleys.—Look at the maps (Figs. 91, 163) and see how the wide valley, called the Great Valley, lies between the high Sierra Nevada on the east, and the Coast Ranges on the west. It is about four hundred miles long and from fifty to sixty miles wide. Near San Francisco are four smaller valleys, all nestled in among the Coast Ranges. Find Santa Clara south of San Francisco, and Santa Rosa and Napa to the north of it, each in a valley of the same name.

The Salinas Valley, opening directly to the Pacific near Monterey, is the largest of the four smaller valleys. All the smaller valleys combined are not nearly so large as the Great Valley. Like Southern California, this part of the state was first settled by the Spaniards, and many places still have Spanish names. In recent years many people from Europe and many eastern states have come to make their homes in this land of fertile soil and pleasant climate.

193. Climate.—All these California valleys have a very mild winter climate because the Sierra Nevada Mountains are high enough to shut off the cold winds of winter from the interior, and the Coast Ranges are low enough to let in the warmer winds that blow from the Pacific. (Sec. 158.) Thus the city of San Francisco passes winter after winter without a single freezing day, yet in summer the daily sea wind is so cool and so constant that strangers from warm countries wear an overcoat even in August. While people are wearing their overcoats in



Fig. 184. The Valleys of Central California.

San Francisco, the temperature of the Great Valley, only fifty miles away, is sometimes 100° in the shade. This is because the sea winds do not reach far into the Great Valley.

The rainfall, like that of Southern California, occurs in winter and not in summer. For this reason few crops, except wheat and barley, can be grown without irrigation. But the dryness of the summer helps the fruit industry, which is remarkably developed in the four valleys. Because the summer days are rainless, California fruit will dry in trays on the ground, and for this reason California produces more dried fruit than all the rest of the United States. Many millions of dollars' worth is sent annually to eastern states, to Europe, and to other continents.

The dryness of the air makes the flesh of the fruit more firm than the flesh of fruit which grows in moist climates. For this reason California cherries will keep so well that they can reach New York City in better condition than can cherries grown in New York State. For the same reason the California peach is so firm-fleshed that it can be quickly skinned for canning by dipping it into hot lye water, a process which turns an Eastern peach to mush. Hence canning peaches, in which she excels the eastern states, is one of the great industries of California.

194. The Great Valley of California is one of the important agricultural regions of the world; the amount of its production is steadily growing. This whole valley was once a large gulf, like the Gulf of California. But streams cut valleys into the mountains along the sides of the gulf, and carried down the sand and mud until the whole gulf was filled, except at the bay near San Francisco. This water-borne soil made the valley nearly level, fertile, and free from stones. Thus the land is easy to cultivate. Also it is very easy to irrigate, because the streams, in filling up the valley, have spread the earth out as streams do when they build deltas—in wide, fanlike slopes, called alluvial fans. (Figs. 171, 179, 183.) Most of these fans make very gentle slopes, which reach from the foot of the mountain down to the river

in the valley. The irrigation canals can be built along the upper sides of the fields on the slopes, and, when the side gates are opened, the water will flow gently across the fields that lie below the canals.

The Kings River, flowing out of the Sierra, built its fan higher than did the other rivers, and dammed the upper part of the San Joaquin River. The water above this dam is Lake Tulare, a lake without an outlet. In dry seasons its water is very low, and in wet seasons it rises and floods hundreds of square miles of land around its shores. Sometimes the farmers try to raise wheat on these muddy lands. If the water rises, the fields become a lake. If it does not rise, a rich crop may be harvested.

195. How the industries have changed.—The industries of the California valleys have changed from time to time since gold was discovered in 1848. Then, in a single year, thousands of men rushed to San Francisco from the eastern states and from many foreign countries. For a time gold was almost the only product of the state. Later it was found that wheat, winter wheat (Sec. 89), grew well during the season of rain. After the reaper was invented, vast fields of wheat were planted in the level lands of the valleys, and vessels loaded with wheat sailed to England by way of Cape Horn.

196. Fruit is king.—Fruit is now the king of California crops. This new industry began to develop when the first railroad from San Francisco to Omaha was completed, in



Courtesy Oakland Chamber of Commerce

Fig. 185. The storeroom of a fruit-canning factory in the Great Valley. Where might this fruit be eaten?



Photo, Ewing Galloway, N. Y.

Fig. 186. San Francisco—looking across the bay toward the Berkeley Hills. To what cities may the ferryboats be going? (Fig. 196.) San Francisco Bay is a safe harbor. How far is it up or down the coast to another such inlet to the interior? (Fig. 163.)

1869. Within a few years the people of California were sending packages of excellent fruit from their gardens to eastern markets. The fruit sold well and the people of the California Valleys planted more orchards, until, finally, the fruit trade was established. The chief wealth of the state is now neither in flocks and herds, nor in the gold and wheat of former days, but in oranges, lemons, raisins, plums, prunes, pears, apricots, peaches, cherries and other fruits, and nuts.

California sends out enough oranges to make twelve big trainloads a day, for four months of the year, each train having thirty cars. In addition, many thousands of tons of canned fruit, vegetables, and dried fruit are shipped annually from California.

Not long ago the people of our eastern cities were buying prunes, raisins, oranges, and lemons from Spain, Italy, and Greece. Now we get what is needed from California, and sometimes there is some left to be exported to Europe. The trees and vines to start these crops were brought from southern Europe, where the climate is mild and the summers are dry like those of California.

197. **New crops** are constantly being established. A few old trees of olives, almonds,

figs, and English walnuts did so well that many more such trees are being planted. The English walnut industry of California has grown very rapidly, and the almond industry is steadily increasing.

198. **Blossom time.**—Nothing can be more beautiful than these valleys in the spring of the year. (Fig. 1.) The valley is then green with fields of alfalfa, wheat, and barley. On the lower slopes of the mountains the orchards are covered with pink and white blossoms. Their perfume fills the air, and bees and insects buzz and hum as they fly from flower to flower. On the higher slopes, flocks of sheep and cattle graze on green, flower-decked pastures. Still higher on the mountains is the darker color of the ever-green forest, reaching upward toward the snow that glistens on the mountaintop. Many travelers visit the Valleys of Central California to enjoy their beauties, and to escape the harsher winters of their home states.

199. **Coöperative methods.**—It is a help to the fruit grower if his neighbors grow the same kind of fruit that he grows. One advantage is that everyone in the neighborhood will then know how to do that kind of work. The stores will keep the needed tools

and supplies. Full carloads of fruit can be shipped out because neighbors can send their fruit together. Another great advantage is gained when many growers join in building packing and storage houses for the use of all.

To secure the advantages derived from coöperation, California fruit-growing is centered in spots, to an unusual degree. For instance, nearly all of the plums and prunes, and many of the cherries and pears are grown in the Santa Clara Valley. There is a long belt of orange orchards on the sloping alluvial fans that spread out from the foot of the Sierra, southeast of Lake Tulare. North of Lake Tulare, around Fresno, nearly everyone raises grapes to be shipped fresh to eastern markets, or to be dried as raisins. In 1920, Fresno County alone grew over two pounds of raisins for each person in the United States. A little farther north, one peach orchard joins another for miles and miles. Along the cool shores of Monterey Bay are more than a million apple trees. In two small valleys north of San Francisco Bay, the Santa Rosa and the Napa valleys, there are many orchards of apples and pears, and also many vineyards. Coöperation has helped to make the fruit industry succeed and grow so large.

200. Working together at harvest time.—Fresh fruit that is sent to market is first taken to one of the coöperative packing houses. Through these community enterprises or associations, thousands of farmers



Courtesy Sacramento Chamber of Commerce

Fig. 188. A California power plant in the Sierra Nevada Mountains. See the pipe that brings water down the mountainside from a stream or canal. Where will the power be used?

work together as one company or organization. The association buys its supplies wholesale, packs its fruit in uniform packages, sends it in carload lots to distant markets, sells it, and returns the money to the grower. The associations even advertise California fruit in other states, so that people will know about it and buy it.

Harvest is a very busy time for fruit-growers. Fruits, such as peaches, apricots, plums, and grapes, are spread on trays and put in the sun to dry. When dried, the fruit is sorted and packed into boxes. Many of the fresh fruits are taken to the canneries to be canned by thousands of women and girls.

201. Vegetables and the tule lands.—Near their mouths, the Sacramento and San Joaquin rivers flow through many miles of swamp. This swamp is often overflowed in

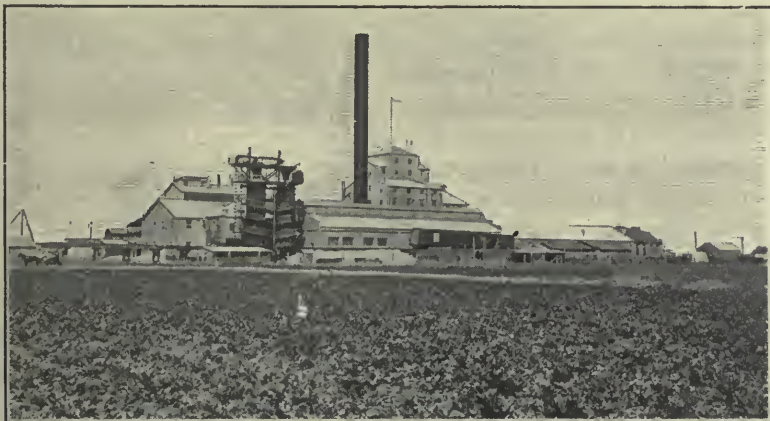


Fig. 187. A sugar-beet field and factory, Hamilton, California.

Photo. Brown Bros., N. Y.

May and June, because the streams rise with floods of snow water that rush down from the high mountains. It has lately been discovered that when dikes are built to keep out the floods, these marshes may be made into the best of farmland. These lands, called "tules," are low, moist, rich, flat as a floor, and especially suited to growing vegetables. Each spring, carloads of California lettuce, tomatoes,



Fig. 189. Where California and Oregon almonds and walnuts are grown.

acres, in which there is only one kind of crop. Much of the asparagus which is canned for the world's market is grown here.

202. Rice.—In 1909 a venturesome farmer north of Sacramento tried an experiment. He opened the dike that surrounded his low land and let the water flow into a field of newly-sown rice. He reaped a splendid harvest. The neighbors then experimented with their fields, and by 1916 there were 67,000 acres in rice. In 1920 there were 162,000 acres in rice, and California surpassed all other states in yield per acre.

203. Other agriculture.—In order to plant more land in fruit, the people have divided the old Spanish ranches having ten, twenty, or thirty thousands of acres into many little tracts of five, ten, or fifteen acres each. Thus hundreds, and even thousands, of people now live on the land that in 1870 or 1880 was just one big sheep or wheat ranch.

Wheat-growing has declined until California now imports some wheat from other states. Barley, in a dry climate, thrives a little better than wheat, so barley is the chief grain which is grown in this region.



Fig. 190. Where California lemons and Florida limes are grown.

onions, celery, and asparagus go from the tule lands east of San Francisco to many eastern cities. In some places one may find a single field containing a thousand

can be irrigated, other crops often pay better than corn unless it is grown for table use.

California once imported butter from east of the Rocky Moun-

tains, but now she sends butter back to the East. She has butter to export, because the irrigated alfalfa fields of the valleys, and the unirrigated barley fields on the slopes produce enough feed for many dairy cows.

Since corn is scarce, hogs also are scarce. In spring many sheep pasture on the slopes above the orchard and farmland, but in summer they are taken up into the mountains, often above the timber line, where their owners rent pasture in the national forests.

204. Cities, trade, and manufacture.—San Francisco is the natural metropolis, or leading city, of this region. It is located on a fine harbor, in the gateway to the Great Valley. How many people live in the cities on San Francisco Bay? Many railroads center there, and steamship lines reach out to Asia, Alaska, Australia, and South America. Lines of steamers go from San Francisco, through the Panama Canal, to the eastern states and to Europe. San Francisco, Los Angeles, and Seattle are rivals, because each city wishes to be the metropolis of the Pacific coast.

The Panama Canal has greatly aided the people of the Pacific coast to market their produce in eastern cities. But Pacific steamships, which used to unload Asiatic goods at Pacific ports, to be

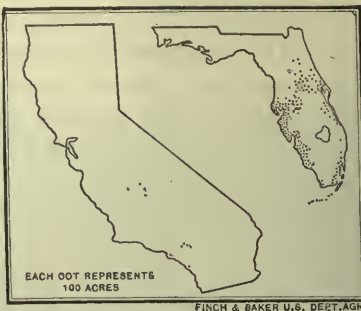


Fig. 191. Where California and Florida pomelos (grapefruit) are grown.



Fig. 192. Where California and Arizona olives are grown.

sent across the continent by rail, now sometimes carry their freight on to the Atlantic ports. It seems that San Francisco and the neighboring cities of Oakland, Alameda, and Berkeley, will grow as their manufacturing increases, and as the valleys that are back of them increase their crops.

The other cities of these valleys, Santa Rosa, Sacramento, Stockton, San Jose, and Fresno, are busy with canneries, fruit-packing houses, and stores which supply the things that fruit-growers need.

The cities of Central California, like those of the southern part of the state (Sec. 190), have lacked coal, and therefore no iron has been produced. Materials for the steel shipyards, foundries, and machine shops at San Francisco have been imported from the East or from Europe. This lack of coal and iron held back the growth of manufacturing for a time, but cheap oil has of late been a great advantage. San Francisco has made machinery for local use, but her manufactured goods for export have been chiefly the things for which the native materials of California may be used, such as lumber, articles of wood, meat, and canned, dried, and preserved fruits and vegetables. Her manufactures are steadily increasing in variety.

205. Unused resources.—Plans are made to build a great irrigation canal at a high level along the foothills of the Sierra Nevada. It will extend from north to south for several hundreds of miles, bend around the southern end of the valley, and go up the western side. By this plan, water that now floods the marshes can be put to work; and idle land now producing only jack rabbits, horned toads, and a few sheep, can multiply the California fruit crop five-, or even ten-fold, if the fruit is needed. It is fortunate that water to be used for irrigation can first be used for power. Thus storage of water for the field also increases the supply of

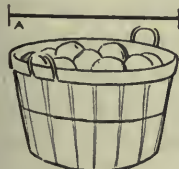
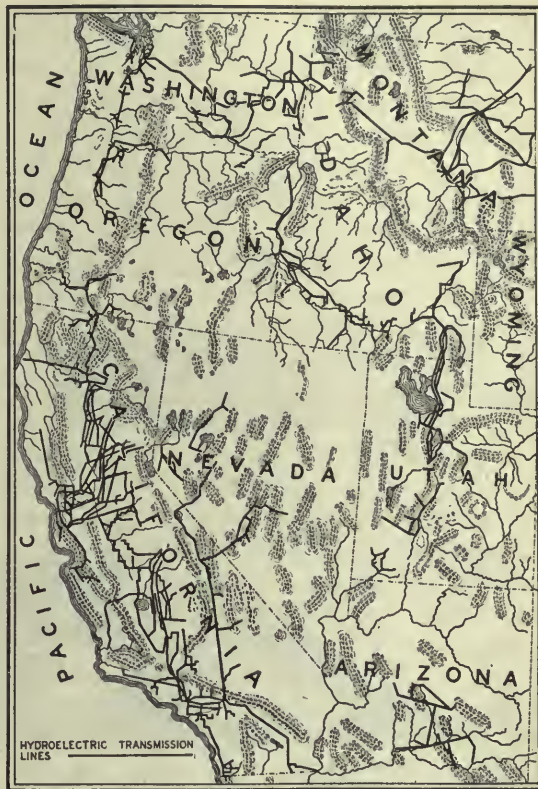


Fig. 193. Value (1919 and 1920 average):

A. California Fruit Crop....	\$235,932,000
B. California Grain Crop....	87,910,500



Courtesy Journal of Electricity and Western Industries

Fig. 194. Can you locate in this area from Fig. 163 an important city that is not on an electric power line fed by a mountain stream? See the many lines from the Sierra mountains to the San Francisco district, and the long straight line to the Los Angeles-Pasadena district. What power sources does the Columbia Basin have?

water for the power plant, and therefore the two great industries of agriculture and manufacture help each other.

QUESTIONS

1. Fill the blanks in the following sentences:

(a) The five valleys of Central California are _____,

_____, _____,

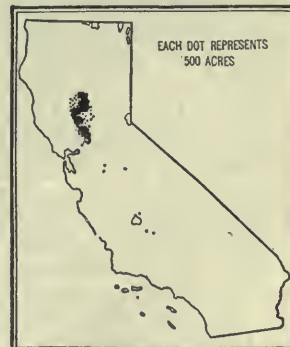
(b) The soil of these valleys was _____

_____ from the _____ by the _____

(c) The temperature of the valley lands is _____ in winter, and _____ in summer.

(d) The rainfall (Sec. 193) is _____, and comes for the most part in _____.

(e) Frost occurs _____



Finch & Baker, U. S. Dept. Agr.

Fig. 195. The California rice area, the newest rice district.

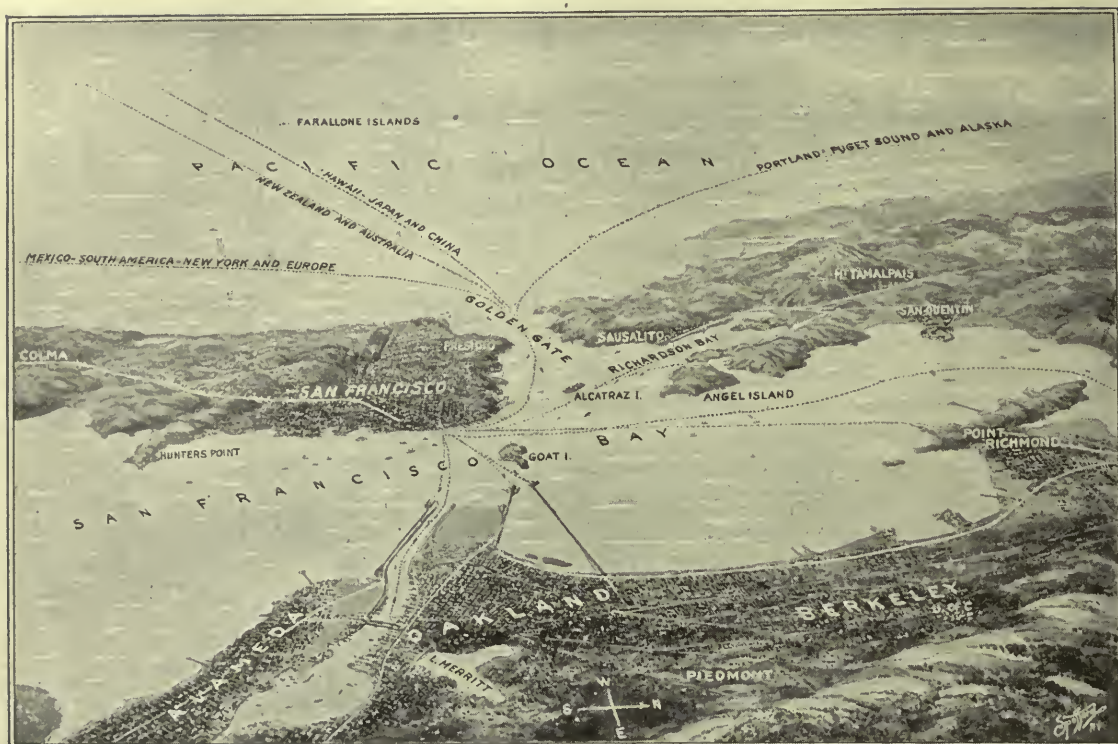


Fig. 196. Perspective view of the northern end of San Francisco Bay looking toward the Golden Gate. Note the location of the cities around the bay. San Francisco is the largest, but appears small because it lies in the distance. What is the population of the four largest cities? (See Appendix.)

- (f) The mountain streams furnish water for.....
and
- (g) The products of the valley orchards are.....
....., ...
- (h) The products of the valley farms are.....
....., ...
- (i) The products of the tule lands are, ...
- (j) The important cities are, ...

2. Model in damp sand the State of California. Show the surface features and cities.

3. Complete the following chart:

HOW MY MAPS AND GRAPHS HELP ME TO UNDER-
STAND THE CENTRAL VALLEY LANDS.

FIGURE NUMBER.	TITLE.	WHAT IT TELLS ME ABOUT CENTRAL CALIFORNIA.

4. In what way has man's ingenuity added to nature's gifts to California, to make it a productive country? 5. Define hydroelectric power. What will its further development mean to these valleys? 6. Name two ways in which the dry California summer is helpful to fruit growers? 7. How have the California valleys helped to make our country independent of southern Europe. 8. Why has San Francisco become the metropolis of central California?

9. What lessons might the people of your locality learn from the California Fruit Growers' Associations? 10. The California Valley farmers are glad to see heavy snow on the mountains in spring. Why? 11. Make a catalogue of the pictures on this region, as follows:

TITLE.	SHORT DESCRIPTION.	WHAT IT TELLS ME ABOUT CENTRAL CALIFORNIA.

12. Write a story describing all the good things the Sacramento and the San Joaquin rivers have done for the people in their valleys.

THE WILLAMETTE-PUGET SOUND VALLEY

206. Another great valley.—The Pacific mountains again divide in Oregon, Washington, and British Columbia, thereby making room for the Willamette-Puget Sound Valley. This valley is to these states what the Great Valley of California is to that state.

Between these two great Pacific valleys there is a wild region



Fig. 197. The Willamette-Puget Sound Valley.

of forested mountain, through which passes the one railroad, connecting the north and the south Pacific coasts.

207. Climate.—The Willamette-Puget Sound Valley has more rain than the California valleys, more frost in winter, and a cooler summer. The climate here has bracing winters and delightful summers, a combination such as cannot be found in any other

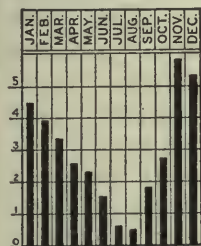


Fig. 198. Rainfall of Seattle, 34.36 in. per year. Willamette-Puget Sound Valley type. Compare this with Fig. 180. Can you explain why these types are different?

large part of the United States or Canada. We must go to France and southern England to find its match.

It is hard for people living in a certain latitude on the Atlantic Coast to understand how different the climate exactly west on the Pacific Coast can be. Roses bloom at Christmas-time at Portland, Seattle, Tacoma, and at other places around Puget Sound. In

much of this valley snow at sea level is a curiosity, rain in July or August is rare, and thunderstorms are so nearly unknown that many people are greatly frightened when one occurs. In the summertime a person in the sunshine rarely feels hot, and he always feels cool in the shade. The people are right in claiming that their climate is wonderful. Indeed, a geographer, Dr. Huntington, of Yale, says that this climate is the best in the world to keep people healthy and to make them active in mind and body, because it has frequent small temperature changes with the passing of cyclones. It is warm enough in winter to tempt people to go out of doors. It is cool enough in summer to make people want to do things, rather than to sit in the shade.

208. Forests and lumber.—This valley, once forest-covered, is now an island of farmland in a sea of forests. The mountains on both sides of the valley are buried deep beneath the dark shade of the most wonderful forests in the world. For miles and miles the tramper must make his way between trunks

of pine and fir that are four, five, and six feet in diameter, and reach up seventy-five or one hundred feet to the first limb. Splendid forests still cover part of the valley floor.

Trainloads of logs wind down from the mountains. Log rafts float upon the Sound. Seattle, Tacoma, and many smaller towns have big sawmills. This is the greatest lumber-manufacturing region in the world, and it is also close to the reserves of the choicest standing timber to be found in any place that is easily accessible. (Sec. 162.)

209. Agriculture.—The summer is too cool for corn, but wheat, barley, oats, and potatoes thrive amazingly. In the Willamette-Puget Sound Valley there are many cattle and much poultry, for which fields of barley, oats and clover furnish good food. Pastures are green all the year. To supply the large demands of Portland, Seattle, Vancouver, Olympia, and Tacoma, many dairy farms and market gardens are needed.

Fruits grow bountifully. Strawberries are equaled only by those of France. Cherries grow to great size. Plums are abundant,

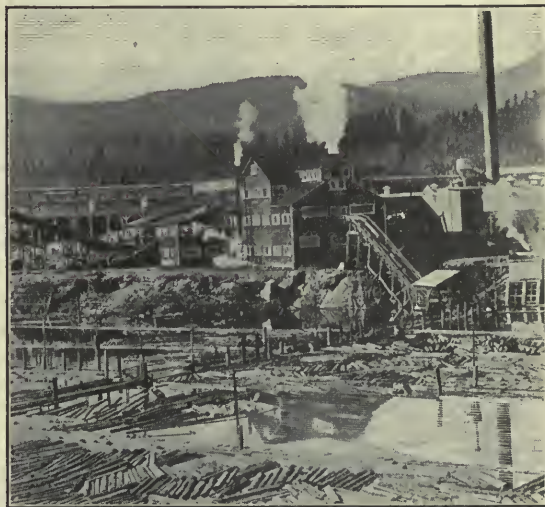


Photo. Brown Bros., N. Y.

Fig. 199. Sawmill at Ione, on Muddy Creek, Washington. Why are the logs stored in the water? Where is the endless chain that takes the logs into the mill?

and many prunes are dried. Many of the fruits of California are grown here, but the chief commercial fruits are of the more northern kinds—plums, pears, cherries, and



Courtesy Portland Chamber of Commerce

Fig. 200. A bird's-eye view of Portland, Oregon, and Mt. Hood. Of what use is the snow on Mt. Hood? Why is Portland a large city?

apples. These fruits are also grown in the British Columbia part of this lowland—Vancouver Island—and on the opposite shores of the mainland. Many shipments of beautiful fruit are sent each year to eastern markets. Loganberries, raspberries, and blackberries also thrive abundantly in these valleys. From the canning factories, the fruits are sent in jam cans to grocery stores, and, in the form of syrups to soda fountains in all parts of our country.

If all the suitable land of this valley were cleared and used for intensive farming we should have an agriculture like that of France and England, whose climate is moist and cool. In those countries, barley, potatoes, forage beets, dairy products, hogs, poultry, fruits, and vegetables are largely produced, and the production of such things may be greatly increased in the Willamette-Puget Sound Valley.

210. Fisheries.—There are oysters in Puget Sound, which, though smaller than those of the Atlantic waters, have a delicious flavor. All the rivers of this region are visited each year by the salmon, one of the most valuable of food fishes. The salmon lives in the sea, and each year the full-grown fish come up the rivers to lay eggs. At this time they are easily caught. Salmon canning on the shores and rivers is an important industry.

211. Manufacturing and resources for manufacturing.—The cities of this valley have grown rapidly, and are thriving centers of manufacture, with sawmills, shipyards, machine shops, and many factories to can fruits and fish, and to make products of wood. What is the population of the three largest cities on Puget Sound? of the three largest cities in the Columbia Basin?

The resources for manufacturing a great variety of articles in the Willamette-Puget Sound Valley are re-

markable. These are :

(1) Climate. (Sec. 207.)

(2) Lumber. (Sec. 208.)

(3) Power. The high and rainy mountains near by have more water power within easy reach than can be found in the whole of any three countries of Europe. (Fig. 194.)

There is also a coal field, with coal of fair quality.

(4) Abundant food. The farms within the valley can produce milk, potatoes, vegetables, and fruits for a much larger population, and still have a surplus for the canning and syrup factories. East of the Cascades are the apple orchards of the Hood, Yakima, and Wenatchee valleys. In the Columbia Basin is the great source of bread and meat supply.

(5) Nearly all manufacturing districts import some raw material. The Willamette-Puget Sound Valley has the all-reaching sea and splendid, safe harbors as natural transportation facilities, as well as good trans-continental railways.

212. Foreign trade.—The valley has a large ocean trade and many advantages for it.

(1) Good harbors. Puget Sound, a deep and beautiful body of water, has enough harbors to hold ten times the ships of all the world. At Bremerton the United States Government has a navy yard where large war vessels are sometimes built. Ocean

steamers come with ease to the excellent harbors of Seattle, Tacoma and Olympia. Portland, on the Willamette River, a short distance from the Columbia, has deepened her harbor so that the largest ships can enter, greatly increasing her foreign trade.

(2) There is a rich hinterland (land that lies back or beyond), and many trade routes reach into this rich interior. The Willamette-Puget Sound Valley opens not only toward the west, but also toward the east. No other Pacific valley has this double advantage for trading with the interior. Look at the location of Portland, Oregon, on the map of navigable rivers (Fig. 80). Explain how ocean steamers and river boats make Portland the natural place for a city.

Transcontinental railroads bring freight over the Cascades from Spokane and the Columbia Basin, and from Duluth and Minneapolis. The trains that carry lumber and fruit to the East sometimes bring back Texas cotton and eastern manufactures for export across the Pacific. Much of the return trade of the Orient reaches New York City by this same route.

Vancouver is the terminus of the Canadian Pacific Railroad, which is the great transcontinental line that serves the Canadian area between Lake Superior, Winnipeg, and Puget Sound. Unfortunately, the country *back* of Vancouver is so rough that there is not much room for farms, but the region has great lumbering and mining resources.

(3) The steamship lines from Portland and Puget Sound carry food and manufactures to Alaska; lumber, machinery, cotton, and flour to Japan, China, and the Philippines; Central America and South America draw some of their supplies from this region; and there is a heavy export through the Panama Canal to the Eastern States and to Europe. What do the returning steamers bring?

QUESTIONS

1. Why are there so many steamship lines from the Puget Sound region? 2. What conditions exist in this valley, favorable to the development of manufacture? of dairying? Why have these industries

not yet been fully developed there? 3. How does climate give the cities of this region a lumber industry? 4. Make a comparison of the Pacific Coast valleys.

TOPIC.	IMPERIAL VALLEY.	VALLEY OF SOUTHERN CALIF.	VALLEY OF CENTRAL CALIF.	WILLAMETTE-PUGET SOUND VALLEY.
Location and bounds				
Temperature.....				
Rainfall.....				
Important rivers....				
Products of orchards				
Products of farms...				
Products of forests...				
Products of pastures.				
Products of mines...				
Important cities....				
Advantages for trade with the interior...				
For foreign trade...				

5. As a member of the United States Bureau of Forestry, write a letter to the Puget Sound lumbermen suggesting better methods for protecting and cutting their forest areas. 6. In what Pacific Coast city would you settle for trade with the Far East? Why?



Photo. Brown Bros., N. Y.

Fig. 201. View of Mt. Rainier, or Mt. Tacoma, from the heart of Seattle. What do the people in the street tell you of the size of the buildings?



Courtesy Boston & Maine R. R.

Fig. 202. Portland Head, Maine, one of the hundreds of rocky points that line the coast from Boston to the Arctic Ocean. Such a rocky coast is not found anywhere on the sandy shores stretching from Long Island to Vera Cruz. The white mist at the right is the splashing water thrown up by a wave as it throws itself upon the rocks. The changing wind and sun, the passing clouds, the rising and falling of the tide give this rocky coast an unending charm.

THE NORTH ATLANTIC COAST DISTRICTS

THE NORTH ATLANTIC COAST PLAIN

213. How this land was made.—Once upon a time, a very long while ago as men count time, but a very short while ago when time is reckoned by the age of the world, what is now the eastern coast of North America was down under the sea. Then very, very slowly it was lifted up, so that what had been sea bottom became dry land, flat and level, made of clay, sand, and mud that had been washed down by the eastern rivers of North America. One can dig a deep well in the plain and not reach solid rock. The plain thus made extends from Cape Cod all the way around to Mexico. There are many such coastal plains in the world. That part of our coastal plain north of the Cotton Belt we call the North Atlantic Coast Plain.

214. The beach and the fall line.—At the eastern edge of this region is the sea, with its waves ever beating upon the sandy beach. At the western edge of the coast plain lies the

hilly Piedmont region. What is now the surface of the Piedmont was once deep down under the earth where the great pressure of the overlying rock helped to turn sand and clay into hard stone. But it has been above the sea level for ages and ages, and the streams and weather action have worn it down till it is not much higher than the surface of the Coastal Plain.

Look on the map (Figs. 21, 241) and see how the streams and rivers, as they flow down toward the sea, cross first the hard, rocky Piedmont earth, then the soft, sandy earth of the Coast Plain. In the rocky region the stream wears away its bed very slowly, but in the earth of the plain it quickly digs a

much deeper channel. Because the streams wore away the sandy soil so much more easily than they did the hard rock, a wide ledge of rock is left in every stream along the eastern edge of the Piedmont. Each stream that enters the Coast Plain from



Fig. 203. The North Atlantic Coast Plain.

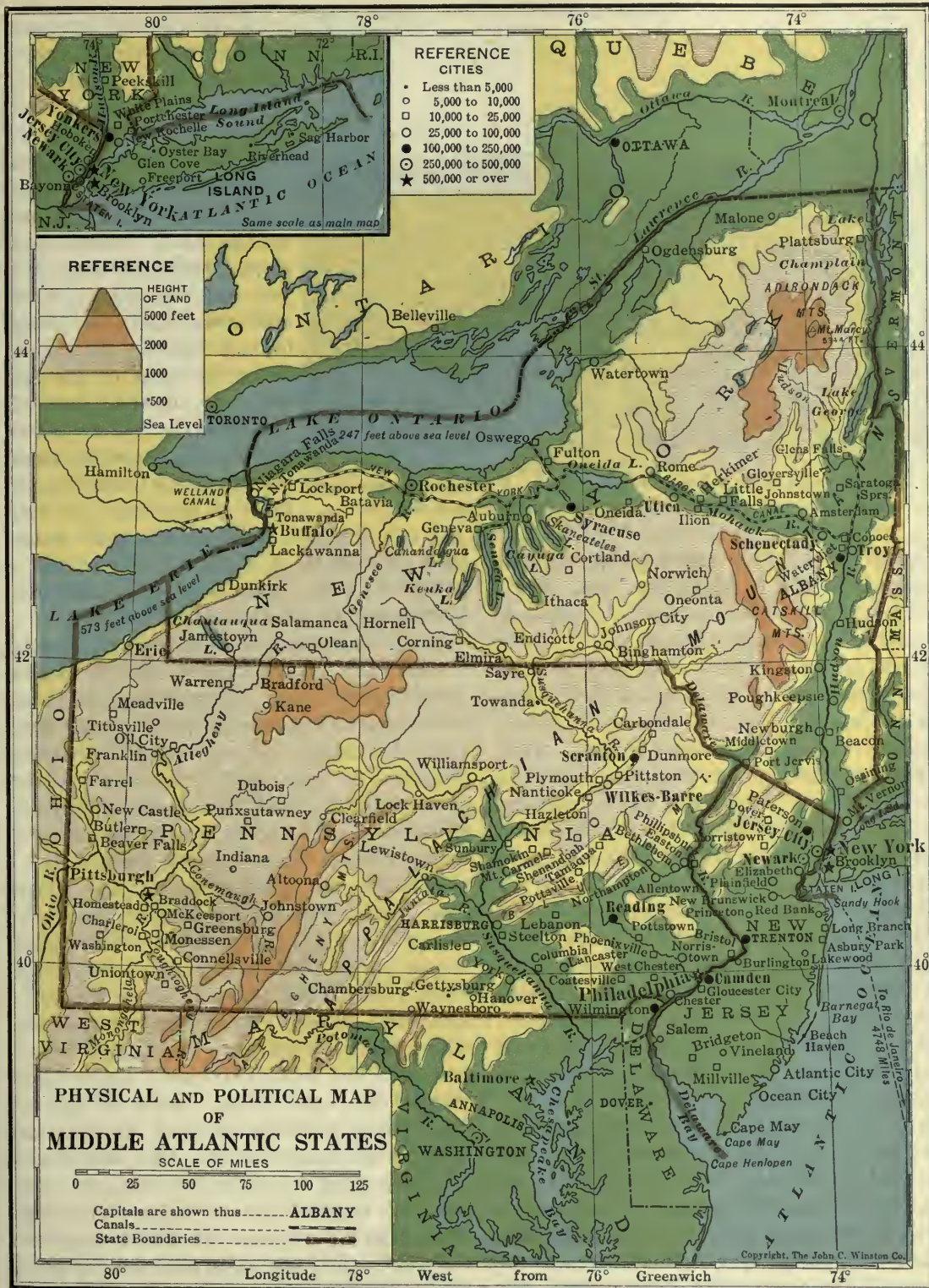


Fig. 204.



Courtesy H. J. Heinz Co.

Fig. 205. Harvest-time in a Delaware truck field. If this picture was taken at twelve o'clock, what do shadows tell about direction of rows?

the Piedmont region tumbles over the last rocky ledge in falls or swirling rapids. This chain of rapids is called the "Fall Line". It extends from New Jersey to a point at least as far as Augusta, Georgia.

Boats going up the rivers have to stop when they come to the ledge of rock where the rapids are. This fall line is a natural place for men to make towns. Why? Throughout its length it is now marked by a row of cities, sometimes called fall-line cities: Trenton, on the Delaware; Philadelphia, on the Schuylkill; Baltimore, on a creek called Jones' Falls; Washington, on the Potomac; Richmond, on the James; and Raleigh, on the Neuse River. These cities, except Baltimore, we shall study in connection with the Northern Piedmont Region. (Sec. 264.)

The Coast Plain includes Long Island and Cape Cod, both of which are as sandy as any other part of the plain.

215. A climate boundary.—The southern boundary of the North Atlantic Coast Plain is a climate boundary, and it is found at the place where the growing season is long enough to let cotton ripen and become an important crop.

216. Waterways and harbors.—After the North Atlantic Coast Plain had been raised

out of the sea, and the rivers had cut valleys in it, a part sank fifty or sixty feet, and, of course, the sea flowed back into the river valleys. Look at the map, and you can see that the ocean water filled up the Susquehanna River valley and made Chesapeake Bay, and you can see that it filled the lower parts of many branch valleys that now make the arms of the big bay. On another part of the coast the water joined two little valleys which have become Long Island Sound.

Look at the map (Fig. 26) and tell how two valleys filled with water made the State of Delaware a part of a peninsula. How can boats pass from the Chesapeake to the Delaware?

Many steamboat lines go from Baltimore to Norfolk, Fredericksburg, and to Yorktown, and to many, many other places on both sides of Chesapeake Bay. These boat lines have greatly helped to make Baltimore the large, prosperous city that it is. Many counties in the Coast Plain section of Virginia have, even now, no railroads, but depend upon sailboats, launches, and steamboats.

217. Unused land.—Part of the Coast Plain was settled very early, but strange to say, much of it is still unsettled. If you walk inland from Tuckerton, north of Atlantic City, you will not pass a house or a field in seventeen miles. You will see only woods, where the big trees have been cut for lumber, and the little ones have been badly injured by forest fires. Much of eastern New Jersey and other parts of the Plain are still a great forest. Why is this land empty of people when it is so near the sea, and when parts of it were first settled so long ago? The answer is given in two words: poor soil.

Sandy soil is generally poor soil for grass and grain crops. Farmers who cut down the forests and tried to raise wheat, corn, and

grass on the Coastal Plain, found that the crops were too poor to pay them for the work. For better land they went to the westward, leaving many of the Coastal Plain farms to be overgrown again with pine trees.

218. Truck farming on sandy soil.—Four new things have recently changed farming conditions in the Coastal Plain: (a) Big cities which need more vegetables; (b) express trains to take produce to these cities; (c) canneries for preserving food; (d) commercial fertilizers to make sandy land productive.

Soil so sandy that it will not produce good grass may be made good for peas, cabbages, strawberries, watermelons, and other garden crops. We learned in Sections 25 and 39 how people in the Cotton Belt and Florida have learned to grow good truck crops on sandy soil by using commercial fertilizer and by planting legumes. The people in the North Atlantic Coast Plain follow the same method. Sandy fields which in 1875 were not worth keeping for wheat fields were allowed to grow up into forests of pine and chestnut. They have since been cleared again, and are producing splendid crops of melons, vegetables, and small fruit and sometimes corn.

219. Marshes and cranberries.—Parts of the coast plain are called saltwater marsh, because they are under water at high tide but are left dry at low tide. This marsh is covered with coarse grass. Other parts of the plain are so level as to be swampy near the streams, and there the cranberry—a little, low vine—grows wild. Many farmers grow cranberries on Cape Cod and in New Jersey. In order to keep down the weeds, they build dams so that they can flood the cranberry bogs for a part of the season; then they let the water off at picking time. The fields are again flooded in cold



Fig. 206. Shipping truck at a wharf on Chesapeake Bay. Can you find the sail and mast of a loaded boat?

Courtesy Div. of Publications, Washington, D. C.

weather to keep the plants from freezing.

220. The journey of the harvest-time.—We saw in Section 25 that harvest-time travels northward through Florida and the Cotton Belt. It travels in the same way from North Carolina to Maine. At Norfolk, in the month of May, the boats and trains daily carry away thousands of barrels of new potatoes and thousands of crates of strawberries. About the end of May, the harvest crosses the mouth of the Chesapeake. Then the southern counties of Virginia are busy sending their potatoes north, south, east, and west, as far as Maine, Louisiana, and Michigan. At that time no other place in the East is harvesting many new potatoes. Harvest-time then moves northward into Maryland, and successively on into Delaware, New Jersey, and Long Island. The strawberry harvest crosses the Chesapeake one month ahead of the potato harvest.

During the summer, hundreds of city families move to the country, where they camp in little houses built for the purpose, and work on the truck farms. Men and women, boys and girls, spend several weeks picking strawberries, peas, beans, raspberries, blackberries, and other crops, as one after the other the crops ripen for the market.



Photo. N F. Davis

Fig. 207. An oyster boat. See the steel dredge which the man at the windlass is pulling over the side of the boat. It is filled with oysters which it scooped up as it was dragged along the oyster bed at the sea bottom. Sometimes the oysters are taken from the bottom with long-handled tongs.

221. Getting the produce to market.—On a road that leads to Philadelphia or New York, one may see in a single day hundreds of auto-trucks loaded with produce rumbling toward town. At scores of railroad stations, freight cars are being loaded for distant places. Steamboats loaded to the limit go up and down the rivers and bays carrying garden truck to the cities. Sometimes there are not enough carriers to haul the produce. Sometimes so much produce is raised that it cannot all be sold in the cities. Then heaps of good things may spoil upon the wharves.

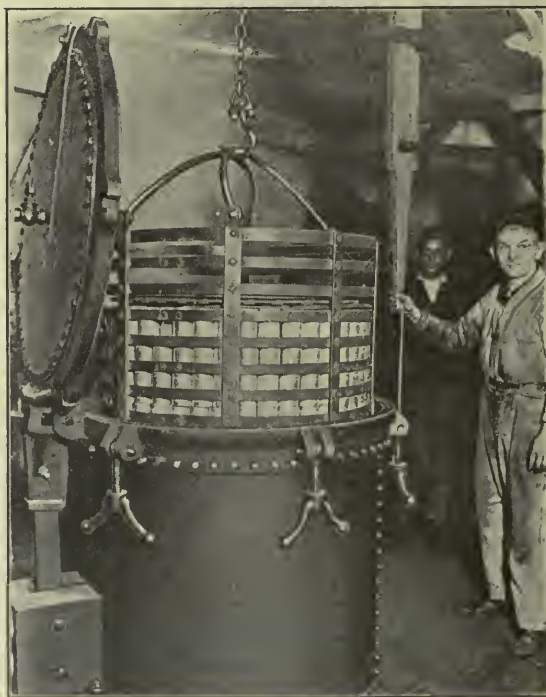
222. Canning factories.—At nearly every little town in the trucking section there are canning factories, where food is saved for distant peoples to eat at future times. In these frame buildings hundreds of women and girls work early and late to can the food, so that it will keep for months and may be easily carried to all parts of the country and to foreign lands. So many boat lines carry fruits and vegetables to Baltimore that this city is the greatest canning center in the world.

223. Fish and oysters.—In the wintertime, the canning factories of Baltimore are busy canning oysters, for which Baltimore is the greatest market in the world. The oyster lives at the bottom of shallow waters, from

the Gulf of St. Lawrence to the Gulf of Mexico. The chief oystering centers (Fig. 207) are the Chesapeake and Delaware bays and Long Island Sound. Every autumn and winter, hundreds of boats, mostly two-masted schooners (Fig. 223), go out on these waters to bring back oysters. Fresh oysters are sent in their shells or in buckets to many parts of the United States. Like vegetables, they are also canned.

224. Oyster-farming.—

Recently men have begun what is called oyster-farming. The baby oyster swims around in the water until it finds a pebble or an old oyster shell, or even a stick of wood, on which it can settle safely and be



Courtesy Maryland State College of Agr.

Fig. 208. Scores of cans of vegetables being lowered by a crane into a cooker. The big lid will shut down, and the steam under pressure will make a heat greater than that of boiling water.

out of the mud. Here it sticks fast and rapidly makes a shell, eating whatever the currents bring within reach. If the baby oyster happens to settle in the mud, it is smothered. If it fastens to something firm and hard, and all goes well, it will grow big and may lay a great many eggs, which hatch into other little oysters.

The oyster-farmer leases from the state a piece of sandy-bottomed bay, though no oysters may be growing there. Then he drops overboard the branches of trees, or old oyster shells. The little floating oysters will settle on such things, and in a few years the oysters will have grown big enough to be taken up with dredges and sent to market. (Fig. 207.)

225. Seashore vacations.—

Another important city in this region is Atlantic City. It has just one industry—that of taking care of people who want a vacation beside the sea. It is the largest city in the world where the only industry is that of taking care of visitors. People love the ocean. They love to walk along the beach, to smell the salt air, to feel the fresh cool breeze, to pick up shells in the sand, and to watch the tide creep up and down, as it does twice a day on all the seashores of the world. They love to bathe in the cool ocean and to be tossed about by its never-ceasing, roaring waves. The shores of New Jersey, Long Island, and Cape Cod are fast becoming rows of towns where people from the hot interior seek refuge from summer heat.

226. Sea breezes.—The sea beach is a place where one can nearly always be comfortably cool. When a stranger who is staying at the seashore in the North Atlantic Coast Plain takes a walk about 9:30 o'clock on a summer morning, he is almost sure to think, "It is getting hot. I fear this will be a very hot day." Suddenly he feels a breeze blowing in from the sea. It is a cool breeze, and it blows all day. What has happened? As the hot morning sun beats upon the sea

and upon the sand, the sand becomes much hotter than does the water. The sun's rays sink deep into the sea, so they cannot warm its surface very much; but they heat the surface of the sand, partly because they cannot sink into sand as they can into water. Besides, it takes more heat to heat water than it does to heat earth to the same temperature. Thus an hour or two of sunshine makes the sand very hot, while it heats the water only a very little. Because the sand of the beach is heated, the air over it becomes hot, too, and begins to expand (Sec. 66). After a few hours the heat has expanded the air on the beach so much that it is lighter than the cooler air over the sea

near by. Then the heavy air over the sea pushes the lighter air upward and flows toward the land to take its place. The lighter air over the beach rises just as a cork in a dish rises when water is poured in.

When the cool sea air flows in to take the place of the hot beach air, we have a sea breeze. The sea breeze blows

on the seashore of nearly all warm places, and so the seashore is much cooler in summer than places inland. When people are sweltering from heat at Philadelphia, Washington, or Pittsburgh, on a summer day, a cool, pleasant breeze may be blowing along the seashore. A cool sea breeze may be enjoyed from Cape Cod to North Carolina, from North Carolina to Florida, and on thousands and thousands of miles of seashore in all warm continents, on many, many islands, and on the shores of many lakes.

227. Land breezes.—As sand cools off much faster than water, the seashore sometimes gets cooler at nights than the sea. Can you explain how it is that there is a breeze from land to sea at that time? Sometimes the west wind blows so strongly in the North Atlantic Coast Plain that instead of a sea breeze there is a land breeze by day. It is a hot breeze, and it blows millions of mosquitoes out of the swamps. It is not pleasant

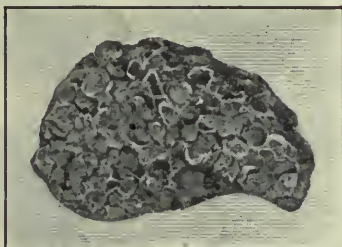


Photo. N. F. Davis
Fig. 209. A Maryland oyster shell covered with dozens of tiny oysters.

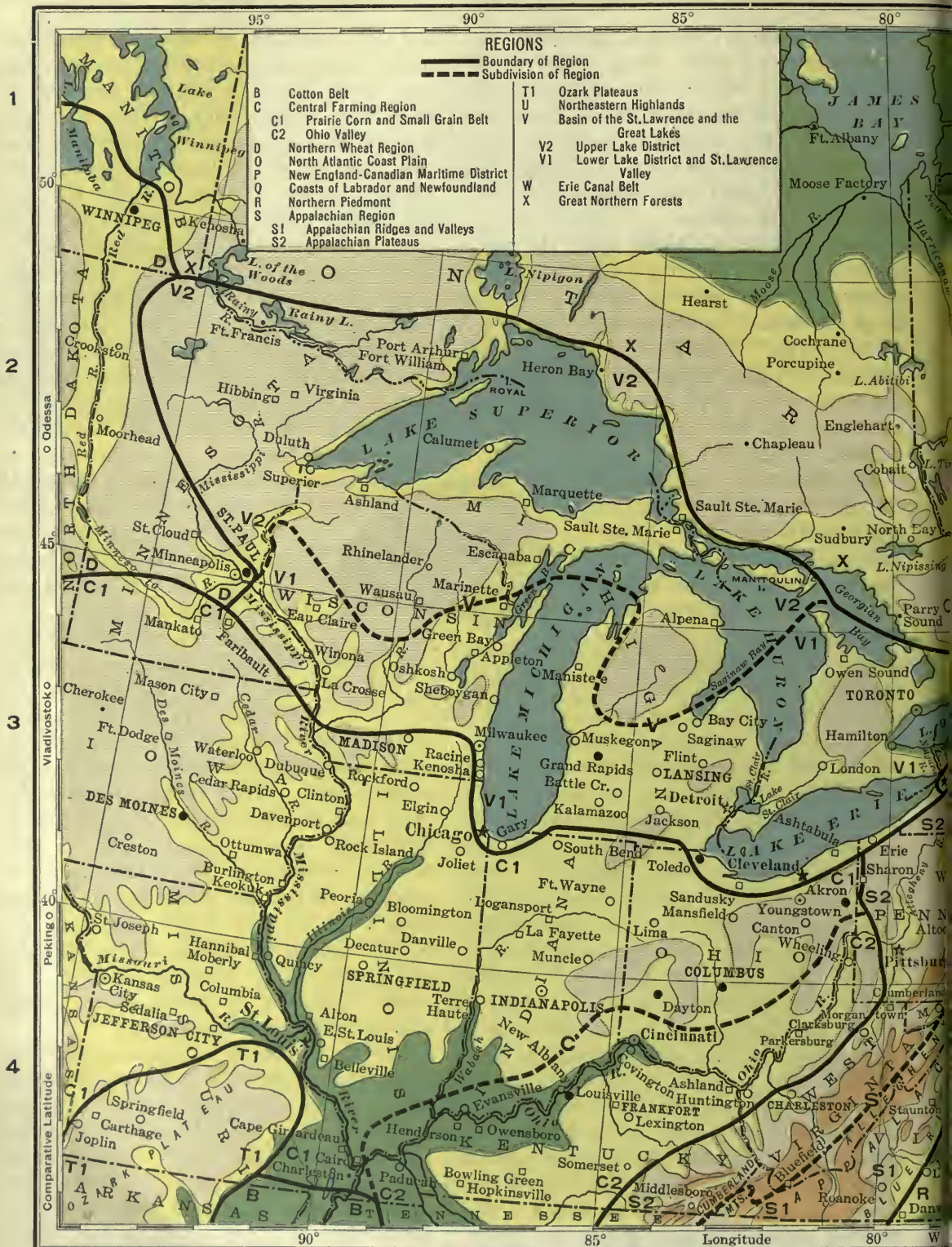


Fig. 210.

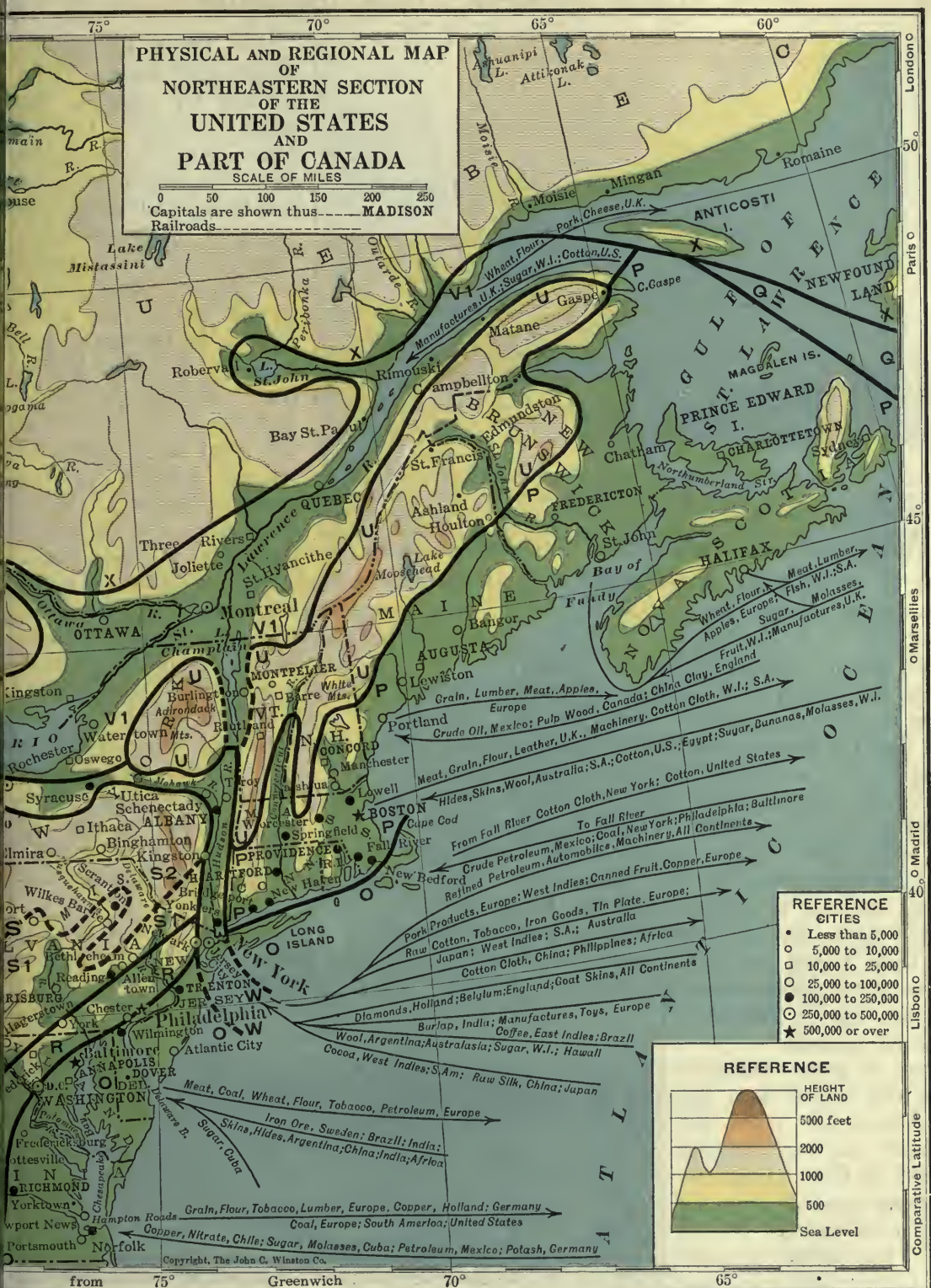


Fig. 210



Photo, International Film Service, N. Y.

Fig. 211. A shipwreck on the North Atlantic coast. The life-saving crew fired a shot carrying a small line over the ship. Then a larger line was drawn on board, and people went ashore in a breeches buoy running on a pulley on the big rope. See the foaming white waves and the rocks. Is the wind blowing from the sea or from the land? Which do sea captains like?

then to be at some of the beach towns. Fortunately the land breeze does not often blow.

228. Resort cities.—People in Pennsylvania, the Ohio Valley, Chicago, and many other places in the interior of North America find that the seashore resort they can reach most easily is somewhere along the shore of the North Atlantic Coast Plain. Although Atlantic City is the greatest of them all, there are many other resorts. In fact there is a chain of them along the New Jersey shore, from Cape May at the south to Sandy Hook at the north, and there are seashore towns on Long Island too. On Cape Cod are thousands of cottages where families go to spend a pleasant summer.

229. A good rainfall.—The sea breeze does not blow far inland. It does not disturb the big cyclones (Secs. 59-70). Since the cyclones come in summer and in winter, the Coastal Plain has rainfall throughout the year, and its climate is very well suited to agriculture.

230. Cities for manufacture and trade.—There are but few cities on the North Atlantic Coastal Plain. Other than shore resorts, the largest cities are near Hampton Roads, at the mouth of the James River. There, Norfolk, Portsmouth, and Newport News cluster around one of the finest harbors in the world and have a growing foreign trade. During the World War this harbor was one of the great naval bases for sending supplies to the armies in Europe. Newport News has one of the largest shipyards in the world.

Norfolk is a great trucking center and also a great peanut market, because there are many peanut farms on the neighboring coastal plain.

There is plenty of raw material for the glass industry in some parts of the Coastal Plain, for glass is made of little else but melted sand. At Glassboro and other towns in southern New Jersey, skilful glassblowers make wonderful glass retorts and queer-shaped bottles that are used in chemical laboratories. Glass is blown or molded into shape while it is still soft like molasses candy.

Baltimore, at the edge of the Coastal Plain, is much larger than any city on the



© Atlantic Foto Service

Fig. 212. Atlantic City, New Jersey. The beach and surf with bathers, the famous "Boardwalk," or promenade, beach-front hotels, and a pier built out into the sea. On the pier are amusement buildings.

plain. It is a distributing center for supplies which are carried out by many small steamboats and sailboats. It also has shipyards, iron furnaces, steel mills, and many factories. Its furnaces are supplied with coal from Pennsylvania. Some of the iron ore comes from Cuba.

231. The future of the North Atlantic Coast Plain.

—The possible future of this sandy land is indicated by a garden made on sandy Cape Cod by a college professor of botany. When he first started to make it, the neighbors told him that the soil was so sandy that he could not make a garden there. But the professor kept on planting. Then the people shook their heads and told one another what a stupid man he was, because no one could make a garden in such sand. But for two years his garden had big, strong, green potato plants, and fine corn. Then you may be sure the neighbors came around and asked him how he did it. This is how it happened. The professor had found out from old books how the Indians raised corn there. He learned that they dug trenches in the light sand, and in the bottom of each they put a layer of seaweed from the beach and a fish for each hill of corn. Then they put back the sand, and planted corn. The professor used seaweed and dried sheep manure. The rotting seaweed not only holds moisture, but it helps to furnish phosphorus, potash, and nitrogen, the things that plants get from a complete fertilizer. By somewhat similar treatment, that of plowing under green crops, millions of sandy acres may be made to produce crops where now there is only a poor, burnt forest or a swamp.

232. A land for meat and milk.—The truck crop yields so much per acre that a small part of the Coastal Plain can grow all



© Ewing Galloway, N. Y.

Fig. 213. Freight yards of the Baltimore & Ohio Railroad at Baltimore. How many forms of iron and steel can you see?

the vegetables which the neighboring city markets will take in a season. From our study of Florida (Sec. 31) and the Cotton Belt (Sec. 43), how do you think this region might become a land of meat and milk? The climate of this plain is so good that it is a pity for men to let any of the land remain covered with only poor pine trees. The swamps that now raise so many mosquitoes should be drained and turned into fields.

QUESTIONS

1. A merchant agrees to supply a hotel with fresh raspberries throughout the season. Where would he obtain his berries at different times? 2. What determines the boundaries of the North Atlantic Coastal Plain? 3. What is its average elevation? character of surface? nature of soil? 4. Make a list of the important products. Why is so much of the plain unused? 5. Name and locate the chief cities. Give a fact of importance about each. Why are there so few cities on this plain? 6. A little boy lost his balloon at Atlantic City. Which way would it blow in daytime? at night? Do these air movements explain why the seacoast is cooler in summer and warmer in winter than Philadelphia?

7. What service is rendered the coastal area by its many navigable rivers and deep bays? 8. How is the truck farmer aided by (a) nearness to the great eastern cities? (b) fast express service? (c) the canning industry? 9. Why has the New Jersey coast become a great vacation land? Plan a day's pleasure at the seashore.

THE NEW ENGLAND-CANADIAN MARITIME DISTRICT

233. A rugged coast.—North of Cape Cod the seacoast does not have the long, straight, sandy beaches that we find between Cape Cod and the Rio Grande. Instead, from Massachusetts to the Gulf of St. Lawrence (Figs. 210, 216) most of the coast is rocky and crooked, with deep bays and many rocky islands along the shore. In the Bay of Fundy the water is so deep at high tide that big ships can then sail over places where there is bare sand or mud at low tide. In most places the tide rises only a few



feet, but the shape of the Bay of Fundy makes the tide there rise forty or fifty feet, which is the highest tide in the world. (See Appendix.)

234. Fishing.—There are many shallow places called fishing banks off the shores of New England, Nova Scotia, and Newfoundland. The water is so shallow that cod and other fish can be caught from the bottom of the sea, and cold seas are richer in fish than warm seas. From the earliest settlement of this region many of the people have made their living by catching cod and other fish. Gloucester and Boston in Massachusetts, and Halifax and Yarmouth in Nova Scotia are the chief fishing ports. The rugged coast is full of harbors.

235. A rugged land.—Instead of a stoneless and level plain like that of New Jersey or Carolina, the New England-Canadian Maritime District is a land of stony soil, rolling hills, and tumbling streams. What are its bounds? The glaciers that once covered it sometimes dammed up the streams, often turned their valleys into lakes, and forced them to flow in new channels, often down rocky hills. In watercourses such as these there are many waterfalls. Since much of the land is rocky as well as hilly, it could not be plowed easily, so trees still cover most of its surface.

236. Changing industries.—The first set-

tlers who came to this hilly country made their living by farming on small stony farms. At first they made nearly everything they used. But when the factories were started in the towns, many of the farmers went to work in them, and abandoned their rocky, hilly farms. Other farmers left this region to go to the corn and wheat belts of the Middle West, when they were opened to settlers. There was still another period when farms were abandoned. This was during the World War. Then factories were rushed and wages were high because war supplies had to be produced.

It is not hard to see why this section has changed from a farming to an industrial region. The harbors have made it a good place for fishing and trading, and the waterfalls have furnished power to factory wheels; hence this beautiful country has become a land of towns, rather than of farms.

237. Changing people.—People from many parts of the world are living here. The early settlers of the New England-Canadian Maritime District were chiefly English and Scotch. The name Nova Scotia means New

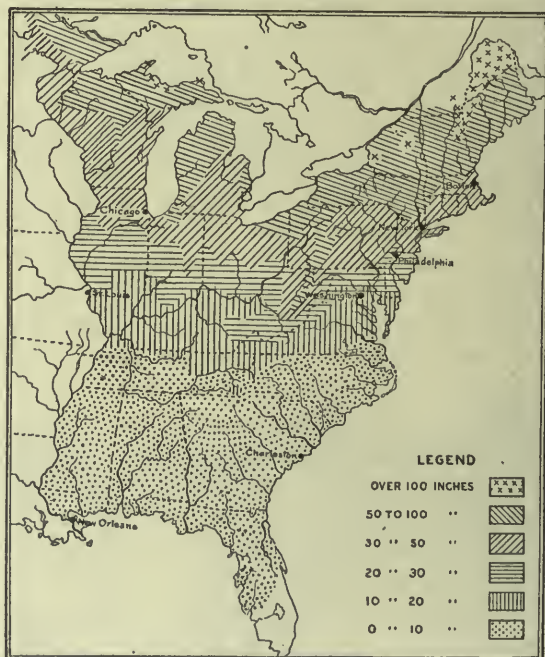


Fig. 215. The average annual snowfall of the Eastern United States. How do you explain the great difference in snowfall in different parts of Maryland? of New England?

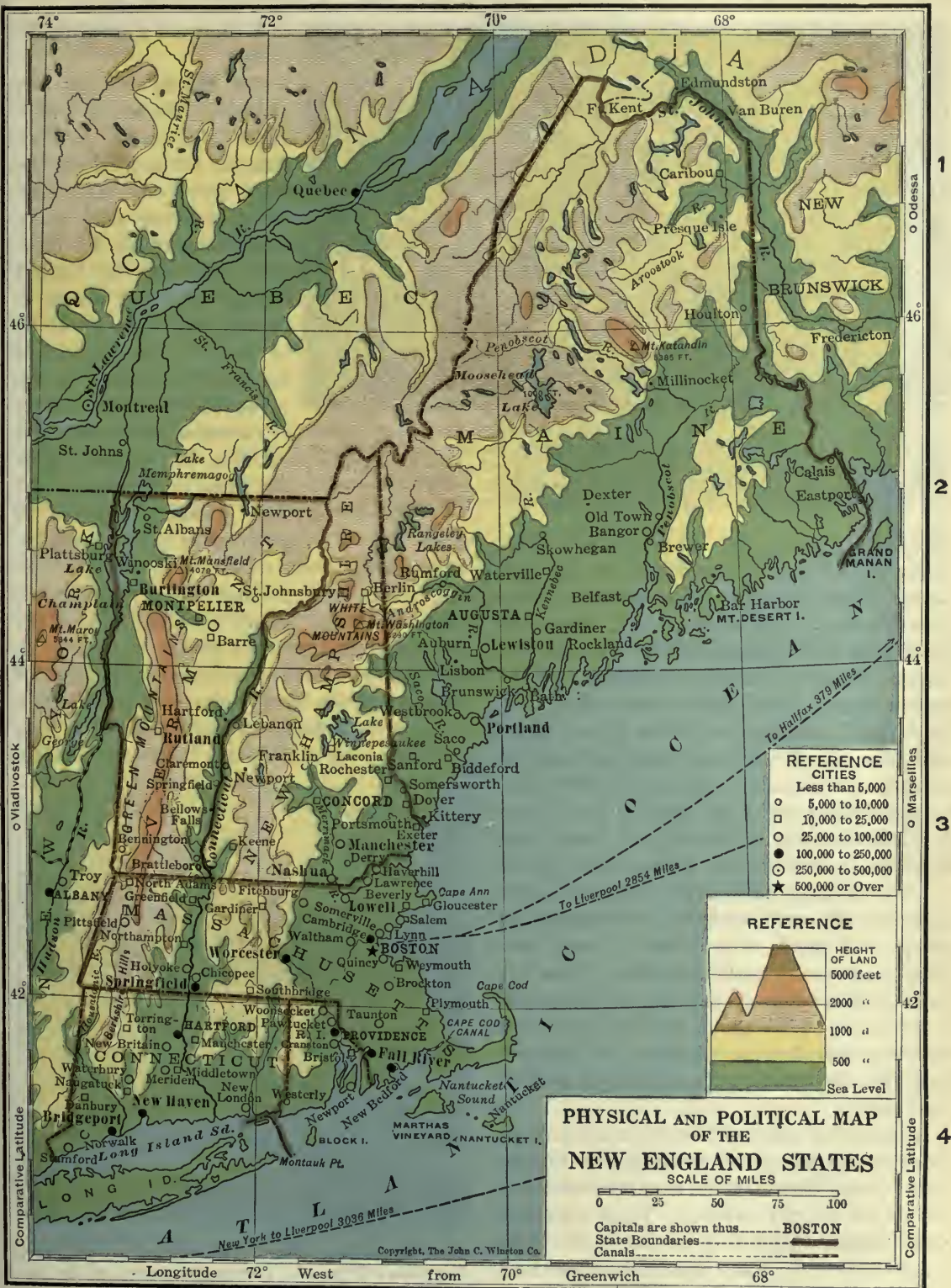


Fig. 216.



Courtesy New Bedford Board of Commerce

Fig. 217. A spinning room in a New Bedford cotton factory. Each of these long machines has hundreds of whirling spindles, each of which spins a thread which is wound on a bobbin (white spools in the picture). The bobbin is then placed in a loom to supply one of the threads for a piece of cloth.

Scotland. After the Revolutionary War, many of the New England people who preferred to stay under English rule went from New England to New Brunswick, where the people are still very much like the English. When the New England factories needed more workers, many people came from Ireland, and later others came from Italy, and from the French-speaking province of Quebec in Canada. More recently still, many workers and their families have come to Massachusetts, Rhode Island, and Connecticut, from Portugal, Poland, and Syria.

238. **Factories and cities.**—Early in the morning the mill whistle in hundreds of towns and small cities blows a long, loud blast that can be heard for miles. This is a call to the workers to get up. A little later the whistle blows again, and thousands of workers start for the factory. At another toot from the whistle all start to work at their machines.

In no other part of North America do so many of the people live in cities. In Massachusetts and Rhode Island over nine-tenths of the people are city dwellers. There are many small cities instead of a few big ones. This is because most of the manufacturing cities have grown up around waterfalls, and there are so many waterfalls and so many harbors

that there are a great many cities.

239. **Hardware and the peddler.**—Factories which make the same product tend to be located in the same towns or cities. The manufacturers who make a large part of all the hardware sold in the United States have their plants in Connecticut. In the town of New Britain, little but hardware is made. In the Naugatuck Valley, scores of factories are working in nothing but brass. How did these centers grow up? The peddlers started it

more than a hundred years ago. Farmers, having little work to do in the winter season, would buy a quantity of pots, pans, axes, cowbells, door latches, and other articles that the blacksmiths had made in their shops. Each would load some of these articles into the farm wagon, or into the sleigh, or on a pack horse, and start off on a long journey to sell the things. The next winter



Courtesy Vermont Marble Co.

Fig. 218. A storage yard of a Vermont marble quarry. The crane can pick up a stone at one end of the yard and carry it to the other end. How does it do it? Note the tracks. Quarrying of marble, granite, and slate is an important industry in New England.

each would start out with another load which the blacksmith had made during the summer. When the railroads came and made it easy to trade with distant parts of the country, the village blacksmiths could not make things fast enough to supply the demand. Hardware factories were built. Now many thousands of people are engaged in this industry, and there are whole districts where but little else is produced.

240. **Cotton and woolen goods.**—The people living in the valley of the Merrimac River are equally busy making cloth. At Lawrence and Lowell in Massachusetts, and Nashua and Manchester in New Hampshire, there are such high waterfalls that enormous power is furnished, and the factories are so huge that we are amazed at their size. The people here know little about work in metals, but they know how to make cotton and woolen yarn, cotton and woolen cloth, and carpets. They know their trade as thoroughly as children know how to play tag. In the towns of the valley of the Merrimac, thousands of spinners stand before long spinning machines; each machine is spinning hundreds of threads and winding each thread on a bobbin ready for weaving. Other thousands of workers, called weavers,



Courtesy Boston Chamber of Commerce

Fig. 219. Looking down State Street, Boston, at the old State House, now surrounded by modern business buildings.



Photo. Brown Bros., N. Y.

Fig. 220. Printing the designs with indelible ink on cotton print-cloth, Fall River, Mass. What is the other way of getting design in fabric?

are each one watching ten or a dozen clacking looms that work away by themselves. But if one of the hundreds of threads on a machine breaks, the whole machine stops. Then the weaver quickly ties the broken thread, and starts the machine making cloth again. A single company at Manchester, New Hampshire, turns out 300 miles of cotton cloth in a day. At that rate enough cloth could be woven to reach from the factory to Europe in the same length of time in which a steamer would make the trip.

Seacoast towns, led by New Bedford and Fall River, Massachusetts, were once busy with the whale-oil industry, because whale fishermen outfitted their ships there, and brought their cargoes to these ports. But whaling has become a small business since the coal-oil lamp, gas light, and electric light have come. Now the people of these towns are busy in cotton mills, the machinery of which is driven by coal brought by sea from Philadelphia, New York, Baltimore, and Norfolk.

Another great cotton-manufacturing town is Pawtucket, Rhode Island. It has water power from the Blackstone River, and on the same stream boats can go down to



Fig. 221. An airman's view of Boston and vicinity with its many cities. How many lakes do you see? Ships are well-sheltered in Boston harbor. What signs indicate that the bay is on a sunken coast?

Providence or Fall River. The chief cotton-manufacturing towns of New England are New Bedford, Fall River, Pawtucket, Lawrence, and Lowell.

Some cities specialize in woolen rather than in cotton cloth. Lawrence and Providence are two leading cities that have developed this specialty; while Danbury, Connecticut, makes Australian rabbit furs into felt hats.

241. Making machinery.—Much machinery is made in New England. It is an advantage to have big, heavy machines made near the place where they are to be used. Why? It is natural that textile machinery, shoe machinery, and many other kinds of machinery should be made in quantities in New England. Worcester, Springfield, Providence, and Boston are important centers for this industry.

242. Shoes.—Long ago, when the Connecticut farmers were peddling the blacksmiths' goods around the country, a few cobblers made shoes in a village in eastern Massachusetts. A peddler took some of the shoes away to sell. This started the shoe

industry, and later factories were built and machines were made to do the work. New England now makes more than half the shoes used in the United States. Most of the work is centered in eastern Massachusetts, where the cities of Brockton and Lynn are respectively the first and the second shoe-manufacturing cities in the country. Shoes are also made in the neighboring cities of Haverhill and Boston. Within a few city blocks in Boston you can find the offices of three hundred different shoe factories, the plants of which are scattered through the neighboring region.

There are many other special centers for manufacturing, such as Providence for jewelry; Danbury, Connecticut, for hats; Holyoke, Massachusetts, for fine writing paper; and Augusta and Bangor, in Maine, for wood products.

243. Centers of manufacture.—Why do the factories which make the same article gather in groups in the different towns and neighborhoods? If you want to start a new shoe factory, can you do it more easily in some little western town, or in Brockton?

Brockton stores keep the supplies which a shoe manufacturer needs; the western town does not have them. If the machinery breaks, there are men in Brockton who know how to repair it; not so in the western town. If you want to start a shoe factory, you will need to find men who know how to use shoe-making machinery. Thousands of such men live in Brockton; the western town has none of them. Retail merchants who want to buy shoes to sell go to Brockton, not to the western town. If you were a shoe worker looking for a job, Brockton would be a good place for you, because it has fifty factories where you might find work; the western town has none. You see, there are many advantages for the employer and for the worker in an established center of manufacture. We shall find many such centers as we study the different manufactures of the world.

Boston is a center of both trade and manufacture. Boston Basin is a low plain fairly dotted with manufacturing cities (Fig. 221) whose sea trade goes through Boston harbor. Boston has a famous public library, and many other interesting buildings. It is also a great educational center with many colleges near it.

244. Manufacturing in Maine, New Brunswick, and Nova Scotia.—There is not so much manufacturing in Maine as there is in southern New England, and there is less in the Canadian part of this district than in Maine. Yet the Canadian district has one great advantage over the American part—there is coal near Sydney in Nova Scotia. There is also iron ore a short distance away in Newfoundland, and now iron manufacture is rapidly increasing in Nova Scotia. Wood pulp for paper is the most important manufacture of the Canadian part of this region. There are also many small woolen and cotton mills there.

Nova Scotia has sometimes been called "the land that was passed by." Like New England and New Brunswick, it has some water power, but it is separated from the rest of Canada by so long a journey that



© Underwood & Underwood, N. Y.

Fig. 222. Trimming and polishing heels in a Massachusetts shoe factory. It is surprising how many kinds of shoe business signs one sees on the streets of Lynn.

the products of its factories have not had as good a chance to reach their home market as have those of the factories of New England. Then, too, the Canadian market, with less than ten million people, is much smaller than the American market with over a hundred million people.

There are some cotton and woolen mills in southwestern Maine, but the chief industries of this state are lumbering and the manufacture of wood pulp. The raw materials come from the forest which covers most of the state.

245. Milk for the cities.—In the New England-Canadian Maritime District, agriculture is much less important than manufacturing, partly because there is so much manufacturing, and partly because so much of the land is not suitable for plowing. Milk for the factory towns is the chief thing sold by the New England farmer. Hay to feed the cows covers more ground than all other crops. Another reason why hay is grown is that much of the land is too stony to be easily plowed, yet if the surface stones are picked up, the mowing machine can cut hay, and the crop costs but little.

246. Vegetable growing.—Market gardens are important because every city needs fresh vegetables. Many of the new immigrants who were farmers in their old homes



Photo. Ewing Galloway, N. Y.

Fig. 223. Fishing schooners, barrels of fish, and fish warehouses, Great Fish Dock, Halifax, Nova Scotia. At the right is a two-masted fishing schooner.

in Europe are tending market gardens near New England cities.

247. Agricultural centers.—Agricultural centers are scattered throughout this region, but, as in manufacturing, each center has its own specialty.

(1) *Sugar corn.*—In southern Maine are many neighborhoods where every farmer has a field of sugar corn. The summers are too short and too cool for corn to ripen fully, but while it is still green its sweet ears are made into the famous Maine canned corn that is sold in grocery stores in many states. The cornstalks and husks are chopped up and put into the silo, to feed the dairy cows in winter.

(2) *Tobacco.*—Much tobacco is grown on some of the level parts of the Connecticut Valley. To make growing conditions just right, a tent of cotton netting or very thin cloth stretched on posts and boards is put over the whole tobacco field. This is expensive, but it pays, because tobacco thus grown is of unusually fine quality.

(3) *Apples.*—In western Nova Scotia is a long, narrow valley called Annapolis Valley. It is famous in England and Scotland for the excellent apples that it produces. In this valley, that extends for miles and miles, nearly every farmer has a big apple orchard, and in some years as many as a million barrels of apples are sold.

(4) *Potatoes.*—On Prince Edward Island the people grow more potatoes to a family than at any other place in America. The crop is just suited to the sandy soil, and to the cool climate made by the cold waters of the Gulf of St. Lawrence.

(5) *Fox farms.*—In Prince Edward Island is one of the new industries of the world—fox farming. (Sec. 318.)

(6) The Cape Cod cranberries are in the Coastal Plain. (Sec. 219.)

248. The vacationist.—The healthful climate and the pleasure to be found beside the sea and in the woods and hills, tempt thousands of city people to this region to spend their vacations in farmhouses, cottages, camps, and hotels. Taking care of these strangers may almost be considered as one of the industries of the region.

249. Trade and transport.—(1) *Traders.* The people of New England and of the Maritime Provinces of Canada have been great traders since the first settlement of the country, three hundred years ago. The strong boats in which they went to the fishing banks were seaworthy enough to make the trip to Europe, and to the West Indies. In 1840, the merchant ships of Boston and Salem were bringing tea from China. From the shores along the Pacific Ocean they brought goatskins, to be used by the shoemakers of eastern Massachusetts. Whalers of Nantucket and New Bedford were cruising in every ocean. Then, as now, coasting vessels went up and down the whole length of our Atlantic and Gulf coasts, taking lumber, granite, and manufactures; bringing cotton, sugar, molasses, lumber, and tobacco to New England.

(2) *Railways.*—To enable Boston to have a shorter railroad connection with Buffalo and the West, the long Hoosac tunnel was dug through the mountains of western Massachusetts. Since the Canadians did not want to be left behind in the opportunity for trade, their government helped to build the Canadian Pacific Railroad from Vancouver to St. John, New Brunswick; and to Yarmouth and Halifax, Nova Scotia. To make a

shorter cut from the Atlantic to Winnipeg, a great bridge has been built across the St. Lawrence at Quebec. (Fig. 210.)

(3) *Ocean liners*.—Each year hundreds of ocean liners call at Halifax and St. John, Portland, and Boston, and connect with the railroads that reach to the heart of the continent and to the Pacific Ocean. Hundreds of factory towns in this New England-Canadian Maritime District now have an extensive trade by land and sea. A town making cloth or paper or shoes can send its product to many cities, and with the money received from the sale of its one product, the town can pay for the thousands of other things that it buys from all parts of the world.

250. *Future*.—What is the future of this region?

(1) *Food*.—Only a small part of this region is in farms. How would the tree-crop agriculture thrive here? (Sec. 87.) The stone-covered glacial fields often have rich, deep soil underneath their rough surface. Would more trees make the country more or less beautiful than it now is?

If we ever need to use our land as closely as the Swiss use theirs, this region can be made to yield large quantities of dairy products, potatoes, vegetables, fruits, and nuts.

(2) *Manufacturing*.—Much more water power can be developed. Some of it can come from waterfalls, some from tides along the coast; but best of all, even the coast towns can use the millions of horse power that can, if needed, be brought by wire from the St. Lawrence River, from Quebec, and from plants beside Pennsylvania coal mines.

The New England-Canadian Maritime Region can keep on buying food, fuel, and raw materials, and paying for them with the fine goods which her skillful and industrious people know how to make.

QUESTIONS

1. Make use of the following chart to explain how Nature helped to make this region a land of fishermen, traders, and manufacturers.

CLIMATE.	RUGGED COAST.	THE ROLLING HILLS.	STONY SOIL.	WATER-FALLS.

2. Make a list of the chief productions under the following heads: (a) Products of the farms; (b) Products of the waters; (c) Products of the mills; (d) Products of the forests. 3. What are the advantages of the Maine coast for a vacation? 4. Can you suggest from Fig. 221, why Boston has become the metropolis of this region? Name the events connected with the early history of our country which took place in and about Boston. 5. What products are made in New England from the following list of raw materials: a light ball of rabbit fur; a bale of cotton; a few pieces of steel; a handful of gold or silver? What cities manufacture each product? Why should such products be made rather than farm machinery?

6. Why have so many more foreigners come to this region than to the Cotton Belt? 7. Write a letter that might be sent from the United States Department of Agriculture urging the New England farmers against abandoning their farms, and suggesting the possibilities of tree-crop agriculture. 8. If you had \$10,000 with which to start manufacturing in New England, what product would you make? 9. Where would you locate? 10. What methods of manufacture would you use? 11. Where would you obtain raw material? labor? power? 12. Where would you sell your product? 13. How has the great glacier decided what men shall do in the Corn Belt? in New England?

14. What are the advantages of the factory method of manufacture over that in which one person performs the entire operation? 15. With coal in Nova Scotia and iron near by, what new industries may come to help the "land that was passed by"? 16. Why were the first attempts to cross the Atlantic by airplane made from Nova Scotia? 17. Compare a factory in Lawrence, Mass., with one in Greenville, S. C., from the following standpoints: material manufactured; source of raw material; factory workers; their nationality; their skill; grade of product. 18. What are New England's necessary imports? Name the region upon which she must depend for each.

LABRADOR AND THE COASTS OF NEWFOUNDLAND

251. A cold, damp land.—It is not far from the potato fields and dairy farms of Prince Edward Island to Newfoundland, across the Gulf of St. Lawrence. But this short distance takes us into what may almost be called another world. (Fig. 14.) It is another world in industry, because an Arctic current brings cold water and icebergs to these shores, and makes the climate so cold that farming cannot be an important occupation. It is another world in government, because Newfoundland and its dependency, the coast strip of Labrador, are independent of Canada. Newfoundland is a colony of the British Empire; its governor

is sent out from London. Like Canada, Newfoundland has a Parliament elected by the people.

This cold land has a rough, rocky, and treeless coast. The icy water makes the shore so cold that trees will not grow there. In winter ice freezes in the sea. The waves break it up; it is then called pack ice. Then it freezes together again in chunks as big as a table or even as big as a house.

When the wind blows from the land, the pack ice is swept out to sea. When the wind blows toward the shore, the ice comes back and fills the bays and piles up on the shore. The ice-cold Labrador current flows from Davis Strait down the coast to the southeastern tip of Newfoundland. In summer the current is dotted with icebergs that float past Labrador and Newfoundland, and melt where the cold Arctic current meets the warm waters of the Gulf Stream off the eastern coast of North America. Some of this current creeps in through the Strait of Belle Isle, so that the island of Anticosti in the Gulf of St. Lawrence, less than two hundred miles north of Prince Edward Island, is too cold for farms, although it has a fertile soil. Newfoundland is not much better for farming, and has for this reason only one farmer to twenty fishermen.

252. **People.**—Of the few people who live in Newfoundland and Labrador, most are

British, but there are still a few of the southern Eskimos on the northern Labrador coast, and a few bands of Indians rove around the interior of that large, almost unexplored region that lies between Hudson Bay and the ocean. There is an Indian tribe in this region which no white man or English-speaking Indian has ever seen. The stranger, before he can get to their tents, is always discovered in time for the Indians to run away and hide. The visitors who have examined their skin tents say that they cook fish by boiling them in buckets made of bark, in which water is heated by hot stones dropped into the buckets. They do not have any of the white men's utensils or goods.

253. **Fisheries.**—Fishing is the chief work and produces the chief wealth of all these people. Summer on the coast of Labrador is a busy time. Thousands of fishermen from Newfoundland go north to camp for the summer, while catching and drying cod.

Only four thousand people live on this coast in the winter time, and the Newfoundlanders call them "Liveyeres." When the pack ice fills their little harbors, and the biting blizzards blow, the little settlements on the bleak and rocky coast of Labrador must be desolate indeed. Only by dog-team and on foot can people travel in winter. These people were so few and so far apart that traders coming there for fish often

imposed upon them by paying less than the fish were worth, so that sometimes the people had scarcely enough to eat. A brave physician named Wilfred Grenfell has spent many years on the Labrador coast, helping the fishermen to have schools and hospitals and better ways to market their fish.

In the winter the men of Labrador and Newfoundland catch seals that lie on the pack ice along the shores. But seals are not



Photo. Wm. Thompson

Fig. 224. Fishermen's homes on the island of Saint-Pierre.

nearly so important as cod-fish, which are the chief source of the wealth on this cold coast.

254. A French colony and European fishermen.—The codfishing in this region is so good that many fishermen sail across from Europe each year. French fishermen from Brest and the other ports of Brittany catch fish and dry them along the coast of Labrador. France still owns the two little rocky islands, Miquelon and St.-Pierre, just south of Newfoundland. Before the Revolutionary War, France gave up all her Canadian colonies to England, but she was allowed to keep these two little islands. They are not fortified, and are only used by fishermen as a place for fitting out their vessels, and for salting and drying fish. At St.-Pierre this industry is so important that at the beginning of the season the fishermen gather in a great procession and carry a dory or fishing boat into the church, that it may be blessed at the opening of the codfishing season. Fish! Fish! The whole town smells of fish. It seems like a town in France, with French goods in the shops, French wooden shoes on the feet of the people, and the French language on their tongues.

255. Agriculture.—Gardens are a rarity in Labrador, and people who try to raise vegetables often have to cover them at night with canvas to keep off the frost. The scanty crops grown by the few Newfoundland farmers are crops of the north: potatoes, turnips, oats, cabbages, and hay. The chief farm animals are sheep, which can live on grass, turnips, hay, and oats.

256. Unused resources.—(1) Iron ore is mined near St. Johns, and sent across to Cape Breton and Nova Scotia to be smelted. Some of it comes to the United States.

The iron ore deposits of eastern Newfoundland are large enough to last British



Fig. 225. Fishing off the treeless coast of Newfoundland.

America for several hundred years. What may we expect from this fact?

(2) Since the interior of Labrador is a plateau, its streams can be made to yield much water power as they fall down to the sea. Would you expect factory towns to grow on such a shore, or smelters for iron or other ores, or electric nitrate plants?

(3) Those who like to fish in cold water and feel bracing cold breezes in July may go there for vacations far from the mainland heat.

QUESTIONS

1. Compare the North Atlantic Coast Regions:

TOPIC.	NORTH ATLANTIC COASTAL PLAIN.	NEW ENGLAND-CANADIAN MARITIME DISTRICT.	NEWFOUNDLAND AND LABRADOR.
Location and bounds			
Character of coast...			
Nature of soil.....			
Nature of surface...			
Climate.....			
Products of farms..			
Products of waters.			
Products of mines..			
Products of forests.			
Chief cities.....			

2. Can you explain how the rising price of meat in your own locality will make Labrador and Newfoundland more important to us?

3. What is a fishing bank? Why are great quantities of fish caught off Newfoundland and few off New York? 4. How many reasons can you name why the people of Labrador and the coasts of Newfoundland fish rather than manufacture? 5. Would you care to live at St.-Pierre? (Fig. 224.) Explain.

6. Can you find out something about the work of Dr. Wilfred Grenfell? 7. Describe the hardships and dangers of a Newfoundland fisherman.



Courtesy Surpass Leather Co., Philadelphia

Fig. 226. Trimming goatskins in a Philadelphia tannery for kid gloves and shoes. As goats live in dry countries, many of the skins come from North Africa, India, and China. Where may the shoes be made? Where worn?

THE EASTERN AND CENTRAL UPLANDS

257. **Boundaries.**—With the map before you, look at the group of regions just west of the New England Maritime District and the North Atlantic Coast Plain. (Fig. 210.) Name the regions. The coloring shows that most of these are high lands. On Fig. 14, compare them in height with the Rocky Mountains. Which highland area is higher? Which is larger? Now look again at Fig. 210 and find a low place where we might get through the eastern uplands. Of this group of eastern upland regions, we shall study the smallest first; the one marked *R* on the map—the Northern Piedmont.

THE NORTHERN PIEDMONT

Trace its boundaries on the map. In Section 214, we learned that the eastern boundary is marked by the fall line. Why is this boundary the head of navi-

gation on all the streams which flow across it? The word piedmont means “at the foot of the mountains.” See on the map, Fig. 15, and on Fig. 241 how this region is bounded at the west by the steep Blue Ridge Mountains, which extend almost like a wall nearly all the way from New Jersey to South Carolina. At the northern end, near the Hudson River, the Piedmont is narrow. Toward the south it widens out. Its southern boundary is the Cotton Belt. The clay hills of the Northern Piedmont continue into the Cotton Belt, but since cotton is so important to the people living there, we call that section of the Piedmont a part of the Cotton Belt.

258. **Fall-line ports and manufactures.**—The fall line was the natural place for the early settlers to locate their towns. Their boats could ascend the rivers



Fig. 227. The Northern Piedmont Region.



Fig. 228. Rolling hills of the Northern Piedmont, thirty miles southwest of Philadelphia.

only to the head of navigation, and there they often met the Indians with whom they traded goods for furs. Many of the towns on the fall line were built on the sites of these Indian villages. The falling water at such places can furnish power for mills, and that is the other reason why there is a fall line industrial town on almost every large stream that passes from the Piedmont into the Coast Plain. Trenton stands at the fall line on the Delaware; Philadelphia marks the point where the last rapids appear in the Schuylkill River; Wilmington is situated by the rapids of the Brandywine, a branch of the Delaware; Baltimore lies where a creek called Jones' Falls tumbles into Chesapeake Bay; Washington is by the rapids of the Potomac; Fredericksburg is at the head of navigation on the Rappahannock; Richmond and Raleigh, capitals of two states, are also fall-line cities. In every case the falls fixed the point for the head of navigation, and cities which were started at these points could thrive and grow.

259. A land of rolling hills.—If one should ride west in an automobile across the Coastal Plain, the car would run along roads that are very level. For miles and miles one would not see a hill as high as the top of the car. There is no hard rock by the roadside, but only sand and gravel. But where the road leaves the Coastal Plain and enters the Piedmont, hills appear, some of them higher than houses. Now the road runs up over the top of a hill and down on the other

side into a little valley, then up the next hill and down again, up and down, up and down, never away from the sight of hills.

The clay soil of the Piedmont is heavier and harder than the sand and gravel soil of the Coastal Plain. In the sides of the high banks beside the hilly roads solid rock is often seen. Sometimes the fields are stony and sometimes the fences around them are made of stones that have been cleared from the fields.

When the automobile has followed the hilly Piedmont road for several hours, there appears in the distance a long, blue mountain range. The color of the mountains changes to green as one approaches, and the traveler sees the forest-covered wall of the Blue Ridge, rising to a height of a thousand feet or more. There are cultivated fields on some of the lower slopes.

This Blue Ridge mountain range, which bounds the Piedmont on the west, has several narrow gaps where rivers have worn sharp notches in the mountain range. Through these gaps the rivers drain the Great Valley west of the ridge. Name some of the rivers (Fig. 15). From the Maryland boundary to Reading, Pennsylvania, the mountain is not so high as it is farther south, but beyond Reading it rises again into a sharp ridge that extends to northern New Jersey.

260. Climate.—The climate of the Piedmont is much like that of the Coastal Plain, except that its elevation of 300 to 1500 feet makes its winters somewhat colder. The



Courtesy The Lehigh Coal & Navigation Co.

Fig. 229. Old-fashioned mule-drawn canal boats on the Delaware Division Canal along the Delaware River at Upper Black Eddy, Bucks County, Penna. This picture shows the way the Erie and other canals appeared, when built between 1815 and 1850.

winter east wind is colder when it reaches the Piedmont than when it leaves the ocean. The summer brings no sea breeze to the Piedmont. (Sec. 226.)

261. A home of great men.—Being near the shipping ports at the fall line, the Piedmont was settled early. It was a very important part of the United States at the time of the Revolution. Philadelphia, then the national capital, was the home of Benjamin Franklin, one of the great founders of our country. In those early days the homes of other great men were established in the Piedmont section. President Jefferson's old home (Fig. 230) may still be seen near Charlottesville in the central part of the Virginia Piedmont; President Monroe's old home, near Leesburg, is in the northern Virginia Piedmont. Mount Vernon, which was the home of George Washington, is but a few miles distant from the Piedmont.

262. Agriculture.—It is interesting to see the differences between the Coastal Plain and the Piedmont. In the sandy soil of the plain most of the forests are of pine trees. In the rich, clay soil of the Piedmont there are oaks, hickories, poplars, walnuts, and other broad-leaved trees. In the fields of the Coastal Plain small fruits and truck are raised, such as strawberries, blackberries, melons, cabbage, and peas. In the Piedmont fields are corn, wheat, clover, and grass for pasture. Many horses and cows are to

be seen eating the grass or standing under the leafy shade trees. Since the products of the Coastal Plain are sold immediately, the farmer there needs only a small barn in which to keep his team and tools. As the products of the Piedmont are mainly stock and grain, the farmers need big barns to provide shelter for the animals and to keep feed for winter.

263. Diversified farming.—(1) The farmers in this region nearly all follow diversified farming. They grow wheat, corn, and hay. They have pasture fields, orchards, gardens, chickens, horses, pigs, and some kind of cattle. But these farmers often have one special crop that is their main dependence.

(2) Since the large city markets north of the Potomac River require much milk, many Piedmont farmers keep herds of dairy cows, which in summertime pasture on some of the fields, and drink at clear little streams running from the hillside springs. In winter, the cows eat the hay and corn that was grown on the farms and stored in the barns.

(3) In northern Virginia, the Piedmont farmers raise fine horses especially suited for cavalry use. It takes two or three years for a horse to grow up, and the large, rolling, well-grassed fields of the Piedmont make a very good place for them to



Courtesy Jefferson M. Levy

Fig. 230. Monticello, the home of Thomas Jefferson, standing on a high hill overlooking Charlottesville and the University of Virginia. What did Jefferson do?

pasture. The United States Army has officers there nearly all the time buying horses.

(4) In the central part of the Virginia Piedmont many apples are grown, especially on the hillsides and in the coves at the foot of the Blue Ridge. About the year 1840, a citizen of Virginia who represented our government as Minister to England gave Queen Victoria some Albemarle Pippin apples. The Queen liked the ap-

ples so much that thereafter she always used that kind. Since then some of these apples have regularly been exported to England.

(5) In the Piedmont of northern North Carolina and of southern Virginia, the farmers, not having city markets near, to which they can send milk and butter, raise tobacco instead. It is a crop which keeps well, and can therefore be sent to distant markets. Tobacco takes so much plant food from the soil that the crops have to be planted in new places, or heavily fertilized. This tobacco district has many abandoned fields and gullied hillsides. This part of the Piedmont does not have the herds of cattle or the big red barns that are seen in the Maryland, Pennsylvania, and New Jersey part of the region.

264. Cities.—The Piedmont has two classes of cities: port cities and inland cities. Because boats can sail on the larger Coastal Plain streams, people in the port cities can receive raw materials and ship freight more cheaply than can be done in the inland cities. For this reason the port cities are much larger than the interior cities, which, being distant from the sea, must depend

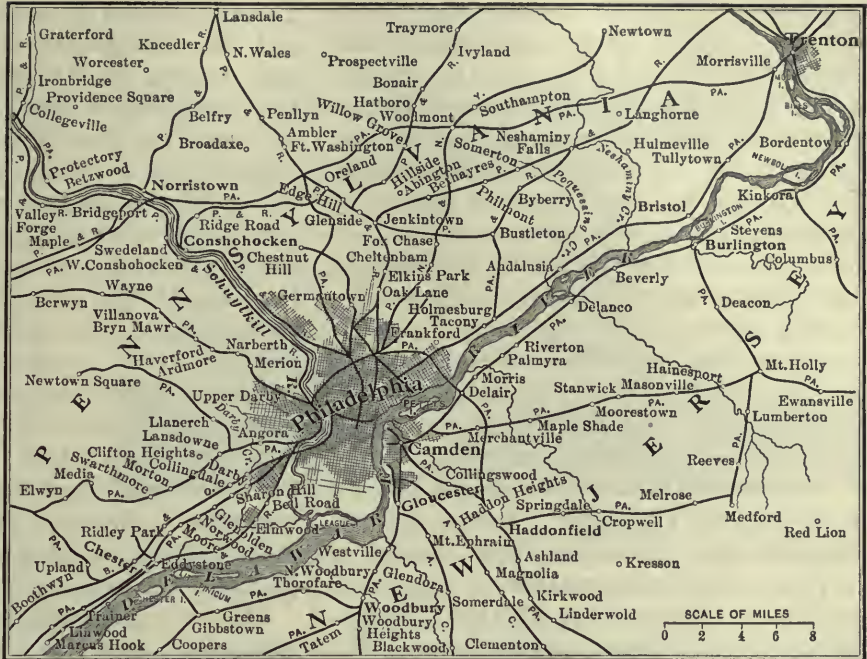


Fig. 231. Map of Philadelphia, Trenton and vicinity. Philadelphia is at the junction of two important valleys. Find the rivers for which they are named.

upon railroads and highways for transport.

The fall line cities have more people than live in all the rest of the Piedmont, most of whom make their living by working in factories whose smokestacks may be seen thickly dotting the cities of this region.

Trenton, Philadelphia, Chester, and Wilmington have much the same advantages for manufacturing. (1) They have coal and iron, because they are near the coal fields and the iron furnaces of Pennsylvania (Secs. 277, 287). (2) They are all situated beside the navigable Delaware. (3) They are all on the main lines of the railroads running to the south and west. (4) They all have an abundant food supply furnished by the dairy farms of the hilly, clayey Piedmont, and by the truck farms of the sandy, level Coastal Plain. Fruits, vegetables, and other foods are brought in boats, wagons, and trains to the city markets. All of these cities manufacture much machinery, and all of them except Trenton have important shipyards.

265. Trenton, the capital of New Jersey, is famous for its manufacture of dishes and other articles of pottery. This industry first

developed in Trenton because there were deposits of clay near by, and because coal with which to burn the clay could be brought in canal boats down the Delaware and Lehigh rivers from the Pennsylvania coal mines. Formerly the Delaware River and the canal from Trenton to New York were important waterways, and it was by these routes that the products of Trenton found their way to market. But now the Pennsylvania and the Reading railroads have main lines running from New York past Trenton to the south and to the west, thus permitting products to be shipped at almost any hour of the day to any part of the United States.

The Trenton factories no longer depend on the near-by clay pits. Indeed most of Trenton's clay now comes from Europe in the vessels that have gone there to take grain and lumber. Trenton (Sec. 243) holds her important place in this industry because the city has become an established pottery center.

266. Philadelphia is much larger than all the other cities on the Delaware combined. In size it is the third city of the United States. What is its population? It was founded by William Penn, a renowned English Quaker.



Courtesy Link-Belt Co.

Fig. 232. Machinery from this Philadelphia machine shop is sent to many states and foreign countries.

The Declaration of Independence was signed and the Constitution of the United States was drafted in famous old Independence Hall, the home of the Liberty Bell, in Philadelphia. The work of most of the people of Philadelphia is in some way connected with its varied manufactures. Many railroad and boat lines give Philadelphia a wide market for the sugar and oil from its refineries. It is the leading city in the United States for the manufacture of drugs, chemicals, and textiles. Great quantities of woolen cloth, cotton goods, and carpets are produced there. Philadelphia started its career as a leather center because tanbark was easily procured from the Pennsylvania forests. The industry continued to develop, partly because a new process of tanning leather with a chemical (chrome) was invented by a Philadelphian.

The city is famous as a great center of publishing, and for the manufacture of machine tools, which are used in other factories to make other machines. The Baldwin Locomotive Company, with works in Philadelphia and its suburbs, is the greatest manufacturer of locomotives in the world. Many cars for railroads and trolleys are also made in Philadelphia.

The Delaware is the leading shipbuilding river of the United States, and Philadelphia is the leading shipbuilding center of our country. There are shipyards not only within the city limits, but also in the sister city of Camden, across the river.

Music from Camden is heard in every land, for Camden exports great numbers of phonographs. Camden also cans vegetables and fruit grown on the Coastal Plain.

Chester and Wilmington make ships and machinery and have many other industries.

In Thomas Jefferson's time, two French brothers named du Pont went to Wilmington and there began to manufacture gunpowder. Now the du Pont Company makes not only gunpowder but also paint, chemicals, dynamite, artificial leather, and many other things, and employs scores of chemists who study how to make new things.

You read about Baltimore in Section 230.

267. Washington.—When our Government was formed, New York was made the first capital of the United States, and Philadelphia was the second. Congress soon decided to move to a more central place, and a spot was chosen that was almost the exact center of the original thirteen states. It was in the woods, beside the little city of Georgetown, at the head of navigation on the Potomac River. To this tract, comprising about sixty square miles, the name of the District of Columbia was given. The land was a gift from the State of Maryland.

A French army officer, Major L'Enfant, and General Washington made the plans upon which the city was laid out. Washington became a very beautiful city, having many parks and wide, shady streets. In the magnificent white Capitol building the laws of the United States are made. Many thousands of people are employed in the great offices of the ten secretaries who constitute the President's Cabinet, and the various courts and commissions that carry on the government work. Almost all the business of Washington is connected with government work and with taking care of

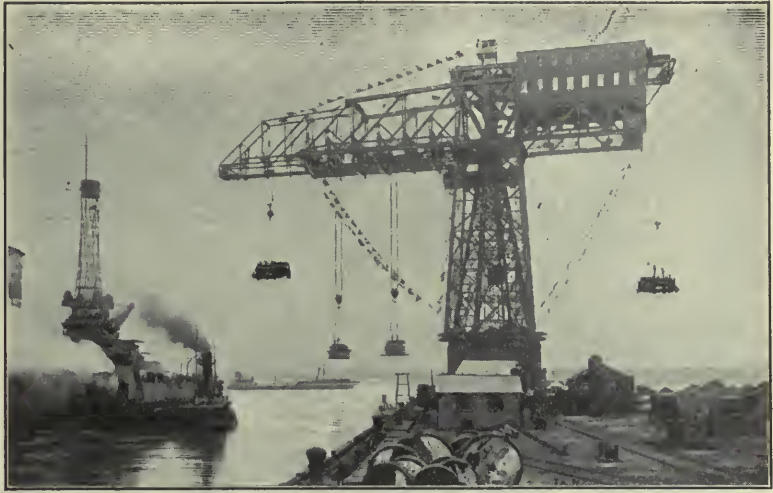


Fig. 233. One of the largest cranes in the world putting locomotives on board a ship at the Philadelphia Navy Yard. They appear tiny beside the great crane. Philadelphia locomotives, machinery, and ships go to all parts of the world.

the people who do this work. Because Washington is the center of the government, many wealthy people have winter homes there, and many go there on government business. Travelers visit the national capital to see Congress in session, and to enjoy the beautiful buildings of the city. Every American schoolboy and schoolgirl should see the White House, the National Capitol, and the Congressional Library, the greatest library in America and one of the most beautiful buildings in the world.

268. Richmond.—The city of Richmond, Virginia, is located at the falls of the James River, and is on the main line of railroads running north and south. Among its im-

portant industries are locomotive works, machine shops, and many tobacco factories which manufacture the tobacco grown in the region to the southwest. The steamboats running up and down the James River carry a great deal of freight.

269. Smaller Piedmont cities.—The inland Piedmont cities, having no important minerals near them, and no access to ships, are



Fig. 234. Map showing electric transmission lines from water power and steam power stations through North and South Carolina. If one plant stops, others on the same wire can keep up the supply of electric current.



Fig. 235. Airman's view of Capitol Hill, Washington. Can you find the Union Station, the Capitol, the white office buildings for the Senate and the House of Representatives, and, at the right, the Congressional Library Building.

Courtesy U. S. Air Service

all smaller than Richmond, Wilmington, or Trenton. The largest is Lancaster, Pennsylvania, situated in the center of a rich limestone district which is the best cultivated agricultural section in the whole Piedmont. Lancaster has many factories, and books and magazines are printed in her printing shops for the publishing houses in New York and other cities.

York, Pennsylvania; Frederick, Maryland; and Charlottesville, Virginia, are in the midst of good farming country. Each has many stores, some factories, and two or three railroads. Charlottesville is an important shipping center for apples. It was there that Thomas Jefferson founded the University of Virginia.

This southern part of the Northern Piedmont region is one of the greatest tobacco growing regions in the world. Lynchburg and Danville, Virginia; Durham and Winston-Salem, North Carolina, are busy with tobacco that is grown near by. Did you ever see an advertisement for Virginia tobacco? for North Carolina tobacco? The product of these tobacco factories goes to almost as many states and countries as does the cotton

of the Cotton Belt. Cotton mills and furniture factories have grown up very rapidly in Greensboro, High Point, and other Piedmont towns. Recently a North Carolina man traveling around the world rode in High Point trolley cars in Rome and Peking. The oak and other hard wood lumber of the Southern Appalachians is excellent furniture and car material.

270. Future — manufacturing and water power.— Since coal is getting so costly, and engineers have learned to harness the big rivers and carry power on wires, the Piedmont has a new source of power. Every

river that crosses the Piedmont may be made to send power to cities many miles away. Name some of these rivers. Baltimore now gets power from the Susquehanna River, and the Southern Power Co. (Fig. 234) is already the second largest hydroelectric power maker in the world.

271. The future—agriculture.—The rolling hills of the Piedmont are beautiful and the climate is healthful. If the fertile hillside soils could be held in place by grass and the roots of fruit and nut trees, and if the level uplands and valley lands were intensively cultivated, this district could comfortably support many more people than now live there (Sec. 87). In some places the soil-saving tree-crop agriculture has been started by the growing of apples in grass-covered unplowed land.

QUESTIONS

1. Name the pleasures you could have on a farm in the Northern Piedmont at different seasons of the year:

SPRING.	SUMMER.	FALL.	WINTER.

2. What does a boy in Florida do in wintertime? Why are not the books and the toys of a Penn-

sylvania boy and a Florida boy as different as their sports? 3. Define piedmont; fall line. 4. Name and locate the fall-line cities. How do falls in a river help make a city? 5. What use is being made to-day of the waterfalls in the Piedmont district? (Fig. 234.) 6. Compare the North Atlantic Coast Plain with the Northern Piedmont as follows:

TOPIC.	NORTH ATLANTIC COAST PLAIN.	PIEDMONT.
Average elevation.....		
Surface.....		
Soil.....		
Climate.....		
Products.....		
Chief cities.....		
Your choice for a home..		

7. Is the Piedmont a good place for the new tree-crop agriculture? 8. Why do the larger cities of the Piedmont lie at the edge rather than in the center of the region?

9. Give three good reasons suggested to you by Fig. 231 why Philadelphia has become the metropolis of the Piedmont. 10. What difference do you find between a Piedmont farm and one in the Northern Wheat Region? 11. Collect pictures and postcards of Washington and Philadelphia, and give a talk on these cities from them.

THE APPALACHIAN REGION

272. Mountains, valleys, and beautiful landscapes.—If you climb to the tops of the forested Blue Ridge Mountains (Fig. 241), you can look down on the fertile Piedmont lying to the eastward; to the westward you can look down many hundred feet upon a land that is still more fertile. If it is spring or early summer, you can see dark green patches of

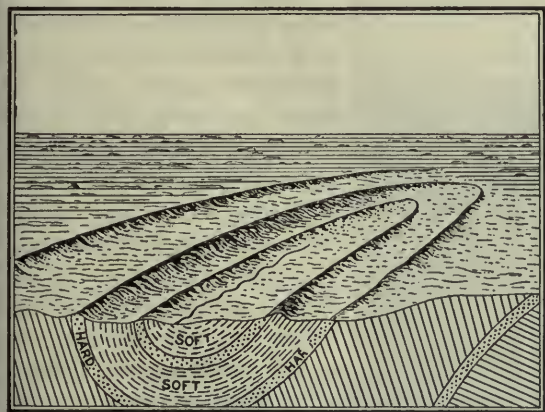


Fig. 236. A diagram showing how hard layers and soft layers of rock, in a country once nearly level, have been worn to make the Appalachian ridges and long narrow valleys, some of which are canoe-shaped.



Fig. 237. See where most of the butter of the U. S. is made. Note especially the American part of the St. Lawrence Valley.

orchard and woodland, and fields showing the rich brown color of freshly-plowed earth or the varying colors of wheat, corn, clover, and pasture. You can discover bits of road, big farms, farmhouses, and sometimes a bit of river shining in the sunlight. Twenty or thirty miles west from the Blue Ridge you can see another ridge. The lowland which lies between these two ridges is the Great Appalachian Valley (Fig. 241), and the distant ridge is its northwestern edge. Beyond that is a narrow valley, then another ridge, then another narrow valley, another ridge, another valley, in a series called the Appalachian



Fig. 238. The Appalachian Region.

Ridges and Valleys. (Fig. 15.) After thirty or forty miles of these narrow ridges with valleys between them, lies what seems to be the last ridge. From its top the highland of the Appalachian Plateau stretches away towards the west so this last ridge has no western slope. It is the Allegheny Front. (Fig. 241.)

Thus the northern Appalachians have the Great Valley on the east, then the narrow valleys and ridges, and then west of them, the plateau (Fig. 241), which stretches from New York to Alabama.

PART I.—THE GREAT VALLEY

273. A great valley highway.—The Great Appalachian Valley is a very long one, furnishing a continuous open road north and

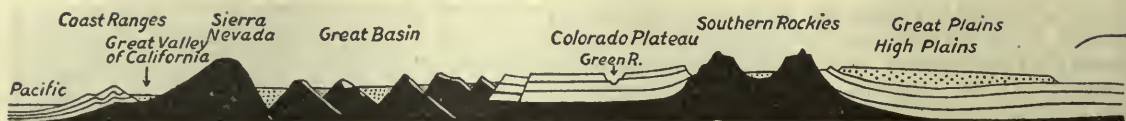


Fig. 239. A section from Pacific to Atlantic, to show the elevation of the country. The line passes near St. Louis, see how many of the regions you can pick out. Green River Canyon is a branch of the Grand Canyon of the

south through the eastern highlands. It is a king of natural highways. One may travel over its entire length, from the Hudson Valley to the Cotton Belt, and not cross a single mountain ridge. All the way one may see to the east and to the west, mountains which run parallel to the Great Valley but never cross it. Look at Figs. 15 and 21, and see the towns that mark its course—Birmingham, Chattanooga, Knoxville, Bristol, Roanoke, Staunton, Hagerstown, Harrisburg, Reading, Bethlehem. What river drains the land where each of these cities stands? At Birmingham, Alabama, the open valley extends for some distance into the Cotton Belt.

The Great Valley has long been a route of travel. Even in the days before the Revolutionary War, its open surface tempted the English Quakers and the German colonists of eastern Pennsylvania, who traveled and settled in this valley all the way down to the headwaters of the James.

Later this route helped other settlers on their way to the valley of the Ohio. Some left the Great Valley near Shippensburg in

southern Pennsylvania, and went over the mountains to Pittsburgh. From this point flatboats drifting down the Ohio River took settlers to points in Ohio, Indiana, and Kentucky. Other settlers from Maryland, Virginia, and North Carolina, bound for Kentucky, drove on down the Great Valley to the headwaters of the Tennessee. In the Cumberland Mountains, which in this region form the western wall of the valley, there is a gap called Cumberland Gap. It is close to the place where Virginia, Tennessee, and Kentucky join. The gap provided an easy passage in the mountain wall, through which the wagons of the early emigrants made their way into the forested country of Kentucky. For many years after the Revolutionary War one family an hour, on the average, drove through this gap seeking a new home to the westward.

274. Limestone and roads.—The Great Appalachian Valley became the great highway for several reasons. First, it is nearly level, and therefore easier to travel upon than is the Piedmont where there are hills, or the Coast Plain where there are many

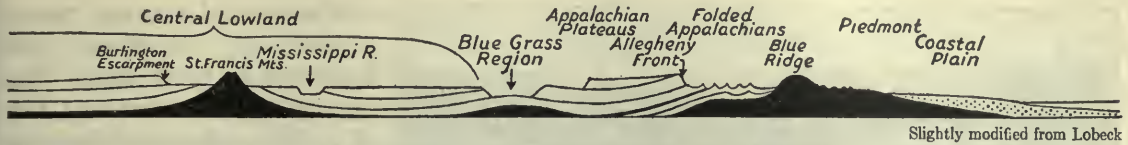
deep rivers to cross. Second, limestone is plentiful here, and out of no other stone can good roads be made so easily. The Great Valley, therefore, has many miles of good stone roads.

If you have read about the battles of Antietam and Gettysburg in our own Civil War, you can see how this valley was the roadway by which the Southern armies went north and the Northern armies went south.

275. Limestone and valley making.—Indeed, it was



Fig. 240. A concrete bridge across a Pennsylvania valley to improve the grade of an anthracite-carrying railroad so that one locomotive can haul more cars. The gap in the distant Appalachian ridge was cut by a river.



Mo. The elevations are greatly exaggerated. The black parts show the oldest rocks. Compare with Fig. 14, and Colorado. The western edge of the Colorado Plateau is a high cliff, called Hurricane Ledge. (Fig. 241.)

limestone that made the Great Valley. Once upon a time, a very long while ago, the whole region was a plateau. Limestone wears away or dissolves in water (Sec. 22) more easily than does any other stone. For this reason the limestone district has been worn down more quickly than the hard sandstone, and therefore has a lower surface. In this way the limestone strips became valleys, and the strips of harder stone remained as ridges. (Figs. 236, 241.)

276. Limestone and agriculture.—The limestone rock of which the valley floor is made breaks up into a very fertile clay soil, which is good for wheat, corn, and hay. Many of the people of this region make their living by farming, and the rich valley fields are covered with grain or dotted with grazing animals. Each year fat cattle and great quantities of corn, wheat, and dairy produce are shipped to the cities of the north and east.

277. Limestone and iron.—Limestone is a raw material that goes into the iron furnace along with iron ore and fuel. Much West Virginia limestone is sent from the Great Valley to the Pittsburgh iron furnaces.

The early settlers found iron ore in many places because limestone sometimes helps to cause deposits of iron ore. In the early days many mines were worked and a great iron-making industry developed, but after a better grade of ore was found in northern Michigan and Wisconsin (Sec. 334) most of the Great Valley mines were closed. Iron furnaces still thrive at Bethlehem, at Lebanon, and near Harrisburg in Pennsylvania; at

Roanoke in Virginia; at Birmingham in Alabama, and at other places.

278. Limestone and cement.—Limestone is a raw material used in cement-making. There are cement plants at several points along the valley. The greatest cement center is in the Lehigh Valley, near Allentown and Bethlehem. (Fig. 204.) In that locality the industry is especially flourishing, because the great port cities of Philadelphia and New York are only about a hundred miles away. These port cities use much cement, and they ship quantities of it overseas.

279. Rivers.—Certain parts of the Great Valley have local names often taken from a river draining that section. Near the Delaware River it is the Lehigh Valley; in northern Virginia, the Shenandoah Valley; the part between the Susquehanna and the Potomac is called the Cumberland Valley. Name a town in each of these sections. Before there were railroads, the rivers that flow out of the Great Valley were most useful to farmers. They were the highways along which wheat, by much hard labor and risk of wetting, was taken down in flatboats to the fall line. The flatboat has been displaced by the railroads. Which river of the Great Valley is now navigable for boats? (Fig. 80.)

280. Towns and town location.—The Great Valley gives us a good chance to study how towns grow. A town often begins at a place where there is some local advantage, such as a deposit of some mineral, rich farming land, or some other natural resource. The

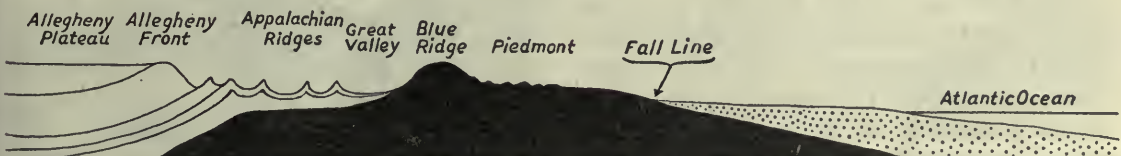


Fig. 241. A cross section of the country from western Maryland to the Atlantic Ocean. Elevations greatly exaggerated. The oldest and hardest rocks are shown in black. Can you see how the Piedmont streams made falls at the Fall Line? (Sec. 214.) How many of the regions shown in Fig. 210 can you pick out here?

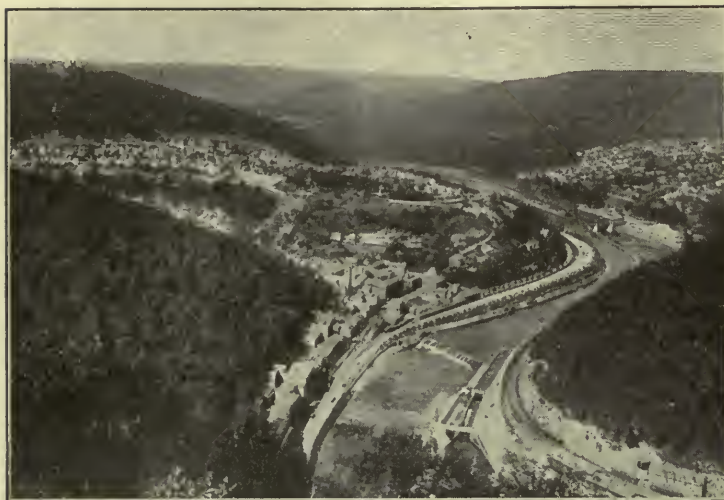


Fig. 242. The Lehigh Valley cutting its way through the Appalachians at Mauch Chunk, Pa. How many kinds of transportation can you see in this picture? Anthracite coal passes this way to New York.

town becomes a city when the locality is favored with a large degree of one or more of these advantages and has, in addition, easy communication with the outside world.

The Great Valley has no large cities like New York, Philadelphia, or Baltimore, but it has many smaller ones. A town or a small city is to be found at almost every place where railroads cross the Great Valley and enter the plateaus to the westward, or the Piedmont to the eastward, because cross-roads are good places for people to meet and to buy and sell goods. At such places stores, shops, and garages are built, and villages grow.

The cities of Allentown and Bethlehem are situated where the advantage of natural resources is combined with that of ease of communication. Look at the map (Fig. 204) and see how the Lehigh Valley enables railroads to pass out of the Great Valley into the coal fields. These two cities are throbbing with manufacture and busy with cement, iron, and steel mills.

The thriving city of Reading is at the place where the Schuylkill River gives an easy route to Philadelphia. The city of Harrisburg arose where the Susquehanna Valley makes a break in the highlands. (Fig. 15.) There the main line of the Pennsylvania Railroad from Baltimore to Buffalo crosses the line from Philadelphia to Pittsburgh.

What would you say caused Hagerstown, Roanoke, and Knoxville to grow larger than the small towns near them? (Fig. 21.) Why does Chattanooga have such an excellent location?

The largest of all the Great Valley cities is Birmingham, Alabama, which, although it is in the Cotton Belt, is also at the southern end of the Great Valley. (Fig. 21, dotted lines.) Here we find a rare thing happening: this one place has the three things needed to make iron. They are coal, iron ore, and limestone. Nearly every-

where else in the world one at least of these things has to be carried long distances to the place where one or both of the others are found. At Birmingham you can stand at one place and see the mouth of the coal mine, the quarry for the limestone, and the open pits in the hillside from which the iron ore is being dug. At no other place in the world can iron be made so easily. So Birmingham, busy with its iron furnaces, has grown very rapidly. It is now as large as Richmond, Virginia, but its English namesake still far surpasses it in size.

At Chattanooga there are iron and steel plants, machine shops, wood-working plants, and cotton mills. In any large town in the

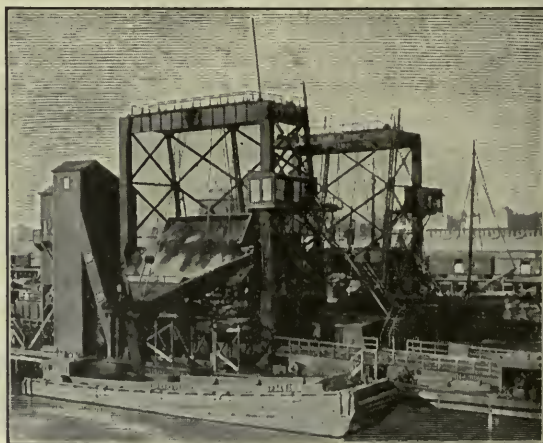


Fig. 243. Dumping cars of anthracite coal into barges at Hoboken, N. J. Where may the barges go? Photo. W. B. Bunnell

Great Valley may be found one or more such plants.

281. Future of the Great Valley.—The towns of the Great Valley have many things to make them prosper. The local mines and quarries have plenty of material for cement plants and iron furnaces; the mountains can furnish wood; the plateau to the westward can furnish coal; and the railroads that come through from the south can bring cotton for the spinning, weaving, and knitting mills that are already established in many valley towns. The rich valley land can be made to yield much greater quantities of food if town markets demand the milk, fruits, and vegetables.

PART II.—THE APPALACHIAN RIDGES AND VALLEYS

282. Places difficult to reach.—To the west of the Great Valley the country changes suddenly. There, one sharp ridge stands so close to the next sharp ridge (Sec. 272, and Figs. 15, 241) that in some of the little valleys there is scarcely room for a wide field. Some of the ridges are so sharp that there is not room on top for even a small field, and the soil is much less fertile than that of the Great Valley. Although some of these valleys are thirty or forty miles long, very little of the land is fit for farms, and not many people live there. Therefore many of the valleys are very much isolated, and some people have abandoned their farms to go to the more level land in western states, or to mines or towns. Some valleys, however, open out into wide coves of fertile limestone soil, with room enough for a dozen or twenty farms, which may be miles and miles from a railroad. One of these valleys, fifty-three miles long and four miles wide, is shaped like a canoe (Fig. 236). The only way to get into or out of it

without climbing over a high ridge is to follow the one stream through Logan's Gap, in one of the mountain walls.

In these valleys the only cities are Cumberland, Maryland, and Altoona, Pennsylvania. Each is at a place where a river cutting through the ridges has made a gap through which a railroad line passes across the ridge country to the plateau. The chief industry in both of these towns is repairing cars and engines.

283. Thermal belts and orchards.—The Appalachian Ridge district is one of the best places anywhere in the United States to grow fruit, because each ridge is a thermal belt; that is, it has frost drainage. (Sec. 184.) Sometimes the frost line is so sharply drawn that the buds on the trees along the lower side of an orchard may be frozen, while those a little higher up escape frost and make a good crop. Fruit trees on these hillside farms have grown so well that many thousands of acres of peach and apple orchards now cover the mountainsides near the Potomac River. Orchards are situated at points where the through lines of railway give the fruit farmers a chance to ship their crop eastward to the cities on the Atlantic slope, or westward across the plateau to Pittsburgh and interior cities.

284. Unused land.—There is room enough in the thermal belts on the hillsides to raise many more peaches and apples than the



Photo. J. Horace McFarland Co.

Fig. 244. Part of a 700-acre apple orchard on the slope of an Appalachian ridge near the Maryland-West Virginia boundary. How does the Potomac Valley help to make these ridges a good place for a commercial orchard?



Fig. 245. A cross section of a valley, with its bent and twisted rocks, in the anthracite region of Pennsylvania. In the center is a river, with a town beside it. The building at the left beside the white mine shaft is a coal breaker. The heavy black layers are coal seams. Why does the earth over old mines sometimes cave in?

markets require. As our population increases, these ridges, with their favorable climate and thousands of square miles of sloping land, may become continuous orchards of crop-yielding trees of many kinds (Sec. 87). They could support prosperous villages which might be connected by good stone roads running the whole length of each valley. We find such wise use of land in Corsica, and in many other European places, even where nature has not given man a climate as helpful as that of our own Appalachians. (Sec. 559.)

285. Coal.—The early settlers in the northeastern end of the Appalachian Ridge region found something in the hillside that they thought was a queer, black stone. It was anthracite, or hard coal, the best kind of coal.

In western Pennsylvania and in the Mississippi Valley are many thousand square miles of soft or bituminous coal. (Fig. 44.)

286. How coal was formed.—All kinds of coal have the same origin. Coal is made of trees and other plants that grew ages ago. The coal beds were originally swamps in which moss, ferns, and big trees grew and fell down into the water. The trunks, leaves, bark, and moss were kept covered by water, until they slowly turned to peat, which is the first stage of coal. (Fig. 336.) Sometimes these peat beds became one hundred feet thick. Then the land under the peat bed sank down so that muddy water flowed over it, and layers of mud and sand covered the peat. Then more trees grew on the earth that covered the peat, and after a long time they, too, were submerged,

making a second layer of peat. Then more mud and sand came on, making another layer. This process continued a very long time. The pressure of all these layers helped to turn the peat into brown coal or lignite, and then into soft black coal, called bituminous coal, and to change the layers of mud and sand

into shale or slate or sandstone. To-day in some places there are many layers of stone and coal, one on top of the other. (Fig. 249.)

It is very hard for such short-lived beings as we humans are to understand how many millions of years it takes for a bed of peat to be turned into good coal. In various parts of our country we can find coal at one or another stage of development, from the living plant growing in a peat bog to the hard coal ready to burn in stove or furnace. When we burn wood, we get the heat that a tree took from the sun and stored in its trunk years ago. When we burn coal, we get the heat that came out of the sun millions of years ago and was stored in the plants of the ancient peat bog.

287. Anthracite or bituminous.—In the ridge country of eastern Pennsylvania, between the Susquehanna and the Delaware rivers, the rocks were folded in such a way that (Fig. 245) the coal was pressed until it became hard. Coal that has become hard through pressure is anthracite. Layers of coal can be found in western Pennsylvania where the rocks are still nearly level (Fig. 249). The coal there is still soft or bituminous, because it has not been pressed so much as has the anthracite. The scattered areas of anthracite between Reading and Scranton contain the best anthracite in America. Europe has none better.

288. The anthracite mines.—From this one small section of eastern Pennsylvania we get nearly all the hard coal used in the entire United States. Here one sees big towers (Fig. 246) with wheels at the top. Cables pass

over the wheels, and run into a large hole in the ground. Fastened to the cable is a little car that every morning runs down into the ground, carrying a load of men, who come out at evening black and grimy from digging coal. The coal is carried to the surface of the earth in little cars that are pulled up by the same engine that lets the men down. While thousands of miners have been digging and blasting beneath the earth, other thousands of men have been busy in the big buildings called breakers, where the coal is cracked and sorted into sizes. Hundreds of boys pick pieces of slate out of the coal, so that there may be good, pure coal to burn. The great centers of this mining industry are Scranton, Wilkes-Barre, Shamokin, and Pottsville. So much coal is dug in these regions that eight railroads are used to carry it away to the cities and towns of the eastern and central parts of the United States.

289. Future of the anthracite fields.—What will be the future of a community depending on anthracite mines? Before all the coal is used, we may expect the people living there to turn gradually to manufacturing. Perhaps they will be able to run their factories by electricity brought by wire from water-power plants, and from coal-power plants in the larger coal fields of western Pennsylvania, which will not be so quickly exhausted.

QUESTIONS

1. Model in damp sand or earth the Appalachian Region (Fig. 15). Show clearly the Blue Ridge, the Great Valley, the lesser valleys, and the eastern edge of the plateau area. Indicate in some suggestive way the chief cities, rivers, and principal products of the region. 2. Fill in the blanks in the following sentences: The Appalachian Ridge country extends through It consists of the mountains, the and many smaller

It is bounded on the east by, and its western limit is determined by the The three great products of the region are, ..., and In its Pennsylvania section are found the greatest mines in the world. Five important cities are, ..., ..., and The richest section of the area is the, which extends from to, is drained by the, ..., and rivers, and has large deposits of Much of this mountain region must always remain in The people who live near the ridges could make their farms more productive by planting on their hillsides. 3. Make use of the following outline to explain how limestone is the Great Valley's friend:

VALLEY MAKING.	GOOD ROADS.	GOOD SOIL.	IRON AND CEMENT MANUFACTURE.	GREAT NATURAL WONDERS.

4. What can you tell about the Appalachian ridges from the following maps and charts: Figs. 15, 236, 241? 5. Tell how Nature has helped Birmingham to become a great center for the manufacture of iron and steel.

6. Find from your dictionary the definition of feuds. Many are found among the mountain people. How much of this unfriendly feeling may be due to the mountains in which the people live? 7. Describe a railroad trip from Philadelphia to Scranton. Describe the same trip when all the coal mines of the region have been worked out and tree agriculture has been fully developed. 8. How may the people of the United States economize their fast-disappearing supply of hard coal?

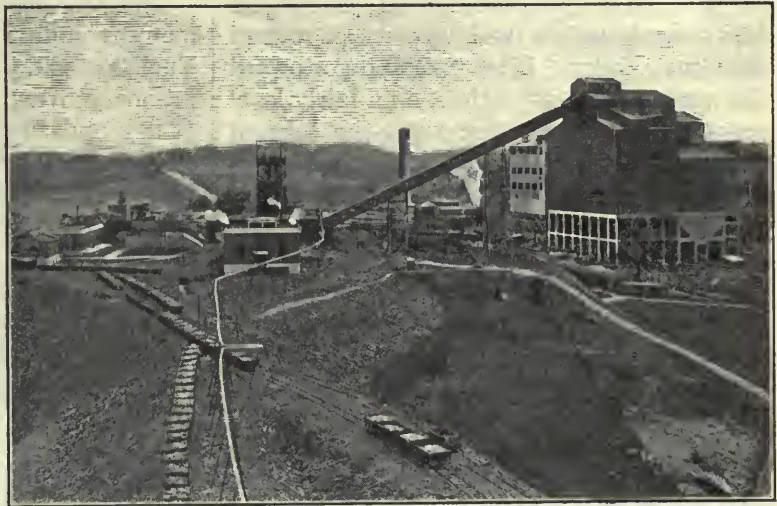


Photo. W. B. Bunnell

Fig. 246. Anthracite coal mine buildings near Scranton, Pa. At the right is a breaker, a building where coal is broken, sorted, sized, and run into freight cars that run under the building. Notice the smokestack of the power plant. Mine cars run through an inclined passage from the mouth of the mine at the foot of the tower to the top of the breaker. In the foreground are the little cars in which coal comes from the mine. The long white thing coming to the bottom of the picture is a covered pipe carrying steam to a distant engine.



Courtesy Link-Belt Co., Philadelphia

Fig. 247. Soft, or bituminous coal mine buildings in the Appalachian Plateau. A layer of coal is near the top. Mine cars run down to the tipple, where the coal runs through screens into freight cars. What states have such mines?

PART III.—THE ALLEGHENY-CUMBERLAND PLATEAU

290. Bounds.—The eastern edge of the Allegheny Plateau, called the Allegheny Front, extends for hundreds of miles through West Virginia, Maryland, and Pennsylvania. A long climb is necessary to reach the top of this one-sided mountain (Sec. 272, Fig. 241), but the climb will be rewarded by the beautiful view. To the eastward lie many ridges that fade away at last in the blue distance toward the Great Valley. If we turn and go toward the west, we are, for a time, on a fairly level country, which is higher than the tops of the ridges to the eastward. The rocks under the plateau have not been folded as they were in the ridge country (Fig. 245). Instead, they lie almost flat, for when this plateau was made, the rocks were simply raised and tipped a little to the westward, which is the direction in which the plateau now slopes. (Fig. 239.)

This plateau (Fig. 21) extends southward into southern Alabama, and its northern edge overlooks the valleys of the Hudson and the Mohawk rivers, and the plains of Lakes Erie and Ontario. Its western edge is the rolling country of the Ohio Valley, a region that is much like the Northern Piedmont.

291. Rough surface—travel and trade.—The streams have cut valleys in the surface

of the plateau. These we can see as we go westward and observe that the streams become larger, and the valleys become deeper and deeper. In some places the streams and branch streams have cut so many valleys and little side valleys that the whole plateau is cut up into little pieces. Sometimes there is room for only one farm on one of these level tops. The steep-sided, deep valleys, or ravines, make such a hilltop farm a very hard place to reach, and a lonely place in

which to live. The northern part of this plateau is not so rough as is the southern part. As one travels south into West Virginia and Kentucky, one sees that the little pieces of upland become smaller and smaller and the valleys are deeper and steeper (Figs. 4, 247). This kind of surface makes it harder to travel and harder to make a living in the southern than in the northern part.

This southern section of the plateau has many mountain farmers. They are of pure English stock. About the time of the Revolutionary War, they came down the Great Valley and started through the mountains, seeking the West. Some did not pass through the rough country but stayed in the plateau, and on that account their life has been very different from that of their cousins who stayed in the Great Valley, and their other cousins who went through the mountains to the more level farmlands beyond where it is easy to travel and use machinery.

292. A new mountain agriculture.—The trouble with many of the mountain farmers is that they are trying to do level-land-farming on steep hillsides. The teacher of Dave Douglas' grandchildren's school says: "A colony of Swiss would turn the coves (moist valleys at the base of the hills) into gardens, the moderate slopes into orchards, the steeper ones into vineyards by terracing, and export

the finest of cheese made from the surplus milk of their goats."

Milk-giving goats of Swiss breeds have been brought up to southern Appalachia and are doing well, and the agricultural schools are teaching people how to make cheese. The new business is growing. This land is also good for tree crops. (Secs. 87, 284.) The Swiss (Sec. 494) have lived in their mountains so long that they have learned how to farm to very good advantage.

As the farmer in our mountains learns to use his land better, he will have enough money to send his children to better schools, and he will be able to buy books and have a telephone. He can do this if he has a herd of goats, or cows, and takes their milk to a neighboring cheese factory, as is done by some mountain farmers. (Sec. 491.)

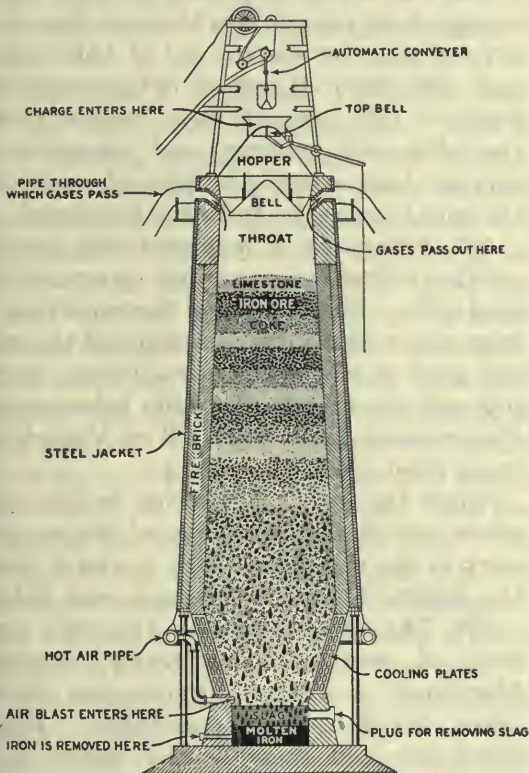


Fig. 248. Section of a blast furnace. Everything that goes into it comes out as gas, molten iron, or molten slag (waste). The fire is kept burning by a blast of hot air. The automatic conveyor dumps measured quantities of materials into the hopper. When the bell is lowered they drop into the furnace, which will make 700 tons of iron per day.



© Underwood & Underwood, N. Y.
Fig. 249. Coal miners at work in West Virginia. How does it happen that the coal has layers of slate in it? (Sec. 286.) One man is boring a hole to put in powder for blasting. Do you see the miner's lamp on his cap? Some miners use acetylene lamps.

293. Forests and lumbering.—Much of the rougher land of the plateau has never been made into farms, and in some places in Pennsylvania, West Virginia, and Kentucky one can go for miles over forested mountain slopes without once seeing a house. Evergreen trees of northern species grow in the higher parts of the plateau because it is cooler there. In the lower parts are oaks and poplars, such as are found in the Piedmont.

There is a great lumber industry. Many of the best trees have been taken to the mills and sawed into lumber. Many oak and hemlock trees were cut only to get the bark to be used in tanneries, some of which are still to be found in this region.

The people who cut the forests are often careless in letting forest fires burn up the young trees that remain. Thousands and thousands of square miles have been burned bare of trees. People who wonder why the price of lumber is so high would understand it better if they could see one of these forests that has been burned year after year until nothing is left but the desolate mountain-side with little dead trees and a few weak bushes standing upon it. Why might this

be called a green desert? The United States Government is now buying some of this burned region and taking care of it so that its forests may grow again.

294. Pittsburgh, a traffic center.—Travel in the plateau is always along the valleys cut by the streams. Otherwise we would be endlessly climbing up one steep side of a valley and down the next side.

One cannot cross the plateau in Pennsylvania without coming to streams that flow down to Pittsburgh. Thus many river routes come together at that point. That is why the early French settlers picked this place as the site for one of their forts. After the French were driven out, Pittsburgh became a starting point for the flatboats of the early settlers and traders (Sec. 85). When the railroads came, they, too, had to follow the river valleys, and thus Pittsburgh became a railroad center.

295. Pittsburgh, an iron center.—Examine the coal fields map (Fig. 44) and see what parts of this region have coal. Can you tell why Pittsburgh took the lead in coal mining? This city is surrounded by thousands of square miles of rich seams of coal, good for smelting iron. Iron ore is found near by, and also some limestone, which is put into the furnace with the ore to help the melting. Pittsburgh is near to the great cities of

northeastern United States. It has developed into the greatest iron manufacturing city in the world. It might be called the capital of the world of coal and iron. Along the river banks, both above and below the city, are iron and steel plants. Some of them have single buildings as large as a field, or as large as several city blocks. Many

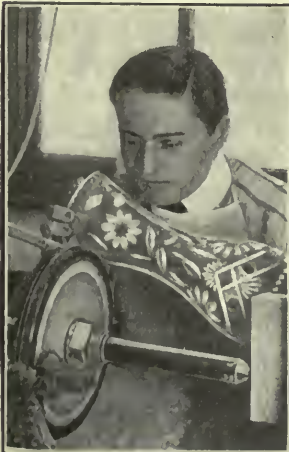


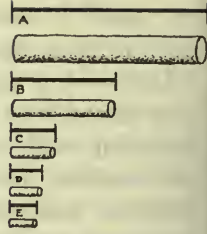
Photo. International Film Service, N. Y.

Fig. 250. Cutting (grinding) figures on beautiful cut glass, near Pittsburgh.

Fig. 251. Leading pig iron producing states (1917): Million tons

A. Pennsylvania.....	16.3
B. Ohio.....	8.6
C. Illinois.....	3.8
D. Alabama.....	2.6
E. New York.....	2.2

How would you show that New York and Illinois had similar advantages for making iron?



towns make steel, and Charleston, W. Va., has a United States Government armor plant. Each day one of these big steel plants sends out hundreds and even thousands of tons of rails to be used for trolley and railroad tracks. Many other useful things are made of iron and steel, such as material for bridges, iron pipe, wire fences, nails, and tin plate, from which tin cans and other tinware are made.

296. Iron ore from Lake Superior.—After Pittsburgh was well started at iron-making, it was found that iron could be made more cheaply from the rich ores that had been discovered near the western end of Lake Superior. (Sec. 334.) Hundreds of big steamboat loads of this ore are now brought down the lakes each summer, and thousands of cars are busy carrying it from lake ports to the iron furnaces in and near Pittsburgh.

297. Pittsburgh, a manufacturing center.—Other industries have grown up around the steel mills. Pittsburgh and the towns near it have many plants that use some of the iron and steel to manufacture machinery. Sand pits and natural gas (Sec. 301) help western Pennsylvania and northern West Virginia to make much glass. (Sec. 230.)

While the men are working in the coal mines and steel mills, many of the women work in the silk mills. This is true in both the anthracite and bituminous coal fields.

298. The soft coal mines.—This rich coal field of western Pennsylvania, western Maryland, and West Virginia has many other towns of the coal-miner. From Pittsburgh and these smaller towns, coal is sent every day by thousands of carloads to New York, Philadelphia, Baltimore, New England, and the central states. Carloads of Appalachian soft coal are dumped by machinery into lake steamers

at Buffalo, Cleveland, and other lake ports, as easily as a man dumps a wheelbarrow. For a very low freight charge, the boats take the coal to Detroit, Milwaukee, and Duluth.

The soft coal of the Appalachian Plateau is easier to dig than is anthracite. Its seams are level and many of them open on hillsides, so that little mine cars can run straight into the hillside, and bring out coal with much more ease than can be done from the deep mines. It is therefore much less expensive to dig soft coal there than to dig hard coal in the ridge country farther east.

More coal is mined near Pittsburgh than in any other part of the plateau. This is true not only because so much coal is there, but also because the Ohio River and its branches made this the easiest place for the railroads to cross the plateau from the great cities of the east to the great cities of the west. As the population of the country grows, and more and more coal is needed, new mines are being opened up, especially in the West Virginia and Kentucky parts of the plateau. The new railroads and mines give the mountain people work and money with which to buy many things. This has changed the way in which they live. Few people anywhere in the mountains now live as Dave Douglas lived (Sec. 3), although it has not been very long since nearly all the people of whole countries lived that way.

299. Foreign people.—There is so much work in Pittsburgh, Fairmont, West Virginia, and the surrounding coal fields that many thousands of immigrants have come from Europe to work and live there.

300. Coke.—Many thousands of people are busy making coke in plants near the coal mines. Coke is used for fuel in the iron



Courtesy Knoxville Board of Commerce

Fig. 252. A row of beehive (old-fashioned) ovens in which coal is partly burned and thus turned to coke. Many Appalachian valleys are smoky and dusty with this industry. The fumes often kill the near-by trees.

furnaces (Fig. 248) because coke is hard and will not choke the fire. Coke is made of soft coal that has been heated red-hot in a furnace which has a very poor draft, so that the coal does not burn well. The heat, however, drives off the gas from the coal, which burns, and a black solid called coke remains in the furnace.

301. Oil and gas.—It was in the valley of the Allegheny River, north of Pittsburgh, that, in 1859, wells were first drilled down through the rocks to find petroleum. Before that time American homes had been poorly lighted with lamps burning expensive whale oil or lard oil. After petroleum was found, and kerosene could be had, it became much easier to light houses well. This first oil field has long since ceased to yield much oil. It usually takes only a few years to use all the oil there is in an oil field.

Petroleum is found in porous rock lying below non-porous rocks through which the oil cannot escape until a hole is made. Natural gas is often found with the oil, and when a well drill goes through the tight rock into the oil and gas, they sometimes spurt out just as soda water does when the bottle is uncorked. In West Virginia, south of Pittsburgh, both oil and natural gas come



Fig. 253. Mountain farms near Big Pigeon River in the Carolina mountains. What is the rainfall of this region? (Fig. 158.) Show the slope of the steepest field by a drawing. What will happen to these fields if they are plowed often? Why is it good to keep this land in trees and grass?

Courtesy U. S. Dept. Agr.

from the wells. They are carried in pipes to Pittsburgh and other cities. The gas provides a cheap fuel in many glass works and other factories.

302. Northern Plateau—a farming region.—Almost no coal is found in that part of the plateau which lies in northern Pennsylvania and New York. The hills there are more rounded and not so steep as those in the southern part of the plateau. It is, therefore, easier to travel through this country and to cultivate the land, most of which has long been used for farming. It is a beautiful rolling country, with grassy hills, many shade trees, and clear, cool brooks. As in New England, some of these hill farms have been abandoned by people who went to the cities, or to the more level farms of the west, but many farmers still prosper by keeping dairy cows and shipping dairy products to New York, Philadelphia, Buffalo, Rochester, and other cities. (Fig. 267.) Fast trains bring the much-needed milk daily.

In this part of the plateau are Binghamton, Elmira, and many other prosperous manufacturing towns, located on the railroads going from Buffalo and the west to New York.

303. Future of the Appalachian Plateau.—In this age of machinery we need more and

still more coal to run factories and railroads and to heat buildings. What does this mean for the future of the plateau? Some of the plateau tops are level and good for farming, but they are so high that it is a great deal cooler there in summer than it is in the lower land near the ocean. (Fig. 253.) Some of the plateau is too cold for corn to grow well, and the season is too short. Farming here must be like that of New England. Mountain slopes have thermal belts, but flat plateau tops have none, and they are places where late

frosts in spring and early frosts in autumn are apt to occur. For this reason, the growing season—the time between the last killing frost in spring and the first killing frost in autumn—is seventy days less on the plateau in western Maryland than it is only one hundred miles to the east, near sea level, along the shores of the upper Chesapeake. (Sec. 328.) Much of the plateau, however, is too rough for farming and should remain in forest. Let us hope that instead of cutting the forests and letting fires keep on destroying them, the American people will soon be willing to take care of their forests as the French, the Swiss, and the Austrian people do (Sec. 516). This cannot be done, however, until more people begin to feel that it is wise and right to save things that may soon be needed by others.

QUESTIONS

1. Add the plateau area to your sand model of the ridge and valley section. Show products, rivers, and chief cities.
2. Make a short comparison between the plateau areas and the ridge country, using an outline somewhat like the following: (a) Location and bounds; (b) Character of surface; (c) Important rivers; (d) Products of the farms; (e) Products of the mines; (f) Probable future development.
3. To which state in the whole Appalachian country has Nature been most kind? Name the products she has stored for man in that state. How have these products made the state a great manufacturing area?

4. Give the population of Pittsburgh; of Birmingham. What natural advantages do these cities possess in common? Which are peculiar to each city? 5. Name and locate six important cities of the Allegheny Plateau region. Give a fact of importance about each.

6. If land in the United States were as precious as in Switzerland, how would the Appalachian Plateau lands be used? 7. What effect does a surface such as that of the Allegheny Plateau (Fig. 15) have upon the building of railroads and highways? upon the life of the plateau people? 8. Would you as a member of Congress vote to purchase Allegheny Plateau lands for national forests? Give reasons for your answer.

9. From your Statistical Abstract (see Question 11, p. 22), list the states of the United States as producers of coal, petroleum, and iron. What is the total production of each of these products by the entire country? 10. Why should the state or national government control some of the Appalachian forests? 11. Give three good reasons why iron ore is brought over the Great Lakes waterway to Pittsburgh for manufacture. Why is the iron not made on Lake Superior?

PART IV.—THE SOUTHERN APPALACHIAN MOUNTAINS

304. A mass of mountains.—In western North Carolina, South Carolina, and northern Georgia, and eastern Tennessee, the Blue Ridge spreads out into a wide mass of mountains. Here several thousand square miles of mountainous country lie between the Piedmont, the Northern Cotton Belt and the Great Valley. This section is not made up of ridges like the northern Appalachians, or of a plateau like the soft-coal fields. It is just a jumbled mass of mountains running in all directions. (Fig. 253.) Like the plateau, it is a hard country to travel through, and at one time people lived there very much as the Douglasses lived. Several railroads now pass through these mountains. There is much lumbering, and many people from the lower, hotter lands of the Cotton Belt and Florida go up there in summer to enjoy the beautiful scenery and cool climate of the mountains, and many northern people go there at all seasons of the year. Asheville is the chief resort center. The people there



Fig. 254. Buildings for handling zinc ore in the Joplin zinc-mining region.

Courtesy American Zinc and Lead Journal

often call these mountains "The Land of the Sky." The forests on the higher parts of this cool section are the same kind as those in New England. (Sec. 316.) This healthful section has no coal, but the soils and rainfall are good and will support a good mountain agriculture. (Sec. 292.)

QUESTIONS

1. Suppose you lived in the little house beside the Big Pigeon River (Fig. 253) and your farm extended up the big mountain. Name all the products you might make your farm produce.

OZARK AND OUACHITA HIGHLANDS

305. A region of few railroads.—This region is quite like another and smaller southern Appalachia. If you look at the railroad map of the United States (Fig. 494), you will see that the eastern half of the country seems to be almost



covered with railroads—Fig. 255. The Ozark and road lines except in Ouachita Highlands.

two areas. One of these is the Appalachian Highlands, and the other is the region of the Ozark and Ouachita Highlands. These upland regions are not tempting to builders of railroads. Why not?

PART I.—THE OZARK HIGHLANDS

306. Surface and soil.—The western part of the Ozarks is a plateau much like parts of the Appalachian plateau. The eastern edge of that western plateau is called the Burlington Escarpment (Fig. 239).



Photo. Ewing Galloway, N. Y.

Fig. 256. A trail down which Ozark logs are dragged to a stream bank without the use of wagons. To what use can this land be put? Why is it hard for families to make a good neighborhood in such a rugged country?

The center of the Ozark region is an irregular mass of roundish, crooked mountains, much like the mountains of western North Carolina, but not so high. There are no straight, open valleys through it; that is one of the reasons why there are so few railroads there. The highest part is named the St. Francis Mountains.

The soil of the Ozark hills is not rich like that of the level prairies. Moreover, in places the soil is covered to a depth of several inches with little pieces of flint stone, about as big as the end of your finger. This covering of flints is all that remains of a thick layer of limestone that once overlaid the tops of the hills. The limestone, which dissolves easily, has been dissolved and carried down the streams, but the flints which were scattered through it dissolve very slowly

indeed. Therefore they remain, and in some places make the soil unsuited to farming. But since trees can get their roots down among the little stones to the earth below, the country was thickly forested when the white man came.

307. Living in the Ozarks.—By the year 1900, men with the aid of cultivators and reapers had farmed almost every acre of the rich, smooth, level plains north of the Ozarks. These people had grown rich and had good schools, and the land was dotted with comfortable houses and big barns. But a short distance to the south, among the stony Ozark hills, the living conditions were very different. There, many counties had no railroads at all, and the people were living very much as Dave Douglas lived in the Appalachian Highlands (Sec. 3). Their houses were small log cabins. In a little patch of a field, fenced with rails, barely enough corn could be grown to furnish bread for the family and to feed the horse and the cow when snow covered the earth in winter. There were no fields of corn with which to feed pigs, so the pigs roamed in the forest hunting nuts and acorns for food. The land is too rough to grow much wheat. Because the summer was too short to allow a cotton crop to mature well, they had little or no cotton to sell. With little to sell, those people had to live in a primitive way. They had to make most of the things they needed, and thus for a time they remained poor. The schools were few, and many of the people could neither read nor write.

308. Apples and peaches.—But a change has come in parts of the Ozarks. Orchards were planted. Now there are apples and peaches to sell. Fruit trees, like forest trees, can thrive in well-drained stony soil.

The Ozark hills, like the Appalachian ridges, have thermal belts, or frost drainage, and in some sections peaches and apples are growing on the level hilltops (Sec. 283). The mountains also serve to keep off the north wind. There have been seasons when cold waves have swept down the middle of the Mississippi Valley, and frozen the fruit

crops from Nebraska to West Virginia, and from Dakota and the Great Lakes to the Ozarks. But in the orchards in the central and southern parts of the Ozarks, the fruit was not frozen in those seasons, and there was a good crop which the farmers sold at good prices. In some parts of the region the people have become as prosperous as are the people of the Cotton Belt or the Corn Belt.

309. Lumber.—Since most of this land is still woodland, there is lumber to sell. Many loads of oak railroad ties and barrel staves are hauled to the few railroads and shipped out of the Ozarks each year. This lumber comes from small sawmills that saw up logs from a few acres, and then move on to the next tract. The farmers haul the logs when they are not busy with their crops.

310. Towns and mining.—We do not expect to find many towns in a region such as this. The largest are Springfield, Missouri, with railroad repair shops; and Joplin, Missouri, the chief center in the United States for zinc mining. In this part of the plateau are many ore deposits containing both lead and zinc, and there are many mines. Zinc smelters are at work in and near Joplin. How many things made of zinc can you find in your neighborhood?

Recently several railroads have been built, but there are still many places that are fifteen or twenty miles from the station. They can be reached only by bad roads over steep hills. You can see why towns would not grow large on such a plateau.

PART II.—THE OUACHITA RIDGES

311. The Arkansas Valley.—South of the Ozarks is the narrow valley of the Arkansas River. This rich, warm lowland can and does grow cotton. It is, therefore, really a narrow strip of the Cotton Belt, merely because it is fifteen hundred feet lower than the Ozark hills immediately to the north of it and the Ouachita Mountains immediately south of it.

312. Mountains with few people.—Just south of the Arkansas River the Ouachita

Mountains cover several counties in Arkansas and Oklahoma. These sandstone ridges with valleys between them are very much like the narrow ridges and valleys of the Appalachians in West Virginia, Maryland and Pennsylvania. (Sec. 282.) Most of the sandy surface of the Ouachita Mountains is still covered with forest, part of which is a national forest. Few people live here, but at the edge of the mountains is the famous health resort, Hot Springs, Arkansas. Visitors from many distant places go there to receive the benefits of the spring water and of the sanitariums.

313. Future of the Ozark and Ouachita Highlands.—The pleasant, healthful climate of this region and its great natural beauty should encourage man to make better use of it. It is far enough south to have winters that are not severe. The summers have plenty of rain and the weather is not so unpleasantly hot as in the prairies to the north or the humid Cotton Belt to the south. Since there are no swamps in which mosquitoes may live, the upland does not have the malaria that afflicts some parts of the Cotton Belt.

As we learn to know our continent better, progressive people from other regions should make their homes in the Ozarks. America is such a big country, and land has been so cheap in the past, that we have used only the best, the part that is level and easy to cultivate with machinery. With the increase in the price of food and land, new kinds of farming are needed in order to develop such regions as these central highlands. We may expect many new things, now that there is an agricultural experiment station and an agricultural college in every state. There is such a college at Fayetteville, Arkansas, in the Ozarks. Agriculture is being taught now in many of the high schools. In Arkansas, as in many other states, there are clubs of boys who are growing corn, pigs, and other valuable things; and of girls who are growing tomatoes and canning them. As our people become better trained, the Ozarks and the Appalachians can become delightful places in which to live, and the

people can have health, good roads, productive farms (Sec. 292), good schools, and pretty towns and villages in the midst of beautiful green hills and blue mountains.

QUESTIONS

1. Find the Ozark-Ouachita Highland on Figure 494. What is its average elevation? (Fig. 21.) How does this influence its climate? In what respect is the climate of the Ozarks superior to that of the Cotton Belt? to that of Corn Belt? 2. How does nature partly repay the people of this region for the rugged surface and poor soil? 3. Name the products of the region, grouping them as follows: (a) Products of farms; (b) Products of orchards; (c) Products of mines; (d) Products of forests. 4. Tell an Ozark farmer how tree-crop agriculture might increase the yield from his farm.

5. Draw a simple diagram picturing a valley between two mountains, such as might be found in the Ozarks. Show on the diagram where you would grow forests; where you would place your orchards; your vegetable gardens and cornfields; your pasture lands. 6. Name some points of similarity and difference between southern Appalachia and the Ozark-Ouachita Uplands.

7. Suppose you were a schoolboy or girl in Fayetteville, Arkansas; what would you desire to learn in order to help make your region a more pleasant place in which to live? 8. Use the Ozark-Ouachita Uplands and the New England Maritime District for illustration, and show how people become more prosperous when they carry on trade.

THE NORTHEASTERN HIGHLANDS

314. **Character and bounds.**—One part of our Eastern Upland Region yet remains—the Northeastern Highlands. It lies north



Fig. 257. The Northeastern Highlands.

of the Mohawk Valley and northwest of the New England-Canadian Maritime District.

How many states and provinces help to make it? What fertile valley cuts this region in two? All the mountains in this highland are very old, and their tops are worn down to a rounded form. The highest peaks of the White Mountains (Fig. 216) and of the Adirondacks have only grass and bare rock, for they are beyond the timber line, but most of the other mountains are forested to the tops.

While the glaciers were leveling the prairie country, they were picking up rocks on the

mountains of New England and eastern Canada and scattering them everywhere. There is even a string of these rocks across Long Island, where the glacier left its terminal moraine. By filling valleys with earth here and there the glacier made dams that held the water of the streams, thus turning valleys into lakes and swamps, and sending streams into new courses where they tumbled over rocky ledges. For this reason, the Northeastern Highland country of mountains and hills and woods is also a land of lakes, swamps, rocky land, and waterfalls.

315. **Climate.**—The growing season in this region is only 110 to 140 days long. The winter is very cold. It is amazing how much colder the winter is in the Adirondacks or in upper New Hampshire than it is in New York City or Cape Cod. At New York it often rains and thaws in the winter months; in the Northeastern Highlands it is nearly always freezing, and almost every winter storm is snow. When snow is shoe-top deep in New York City, it may be knee-deep or waist-deep or even shoulder-deep in the woods of Maine and in the Adirondacks, and the ice on the rivers and lakes is often two or three feet thick. For weeks after people on Long Island can plant their gardens, snow still covers the ground 250 miles to the northward. Hence this region has few farms, few towns, and few people. One sees why skiing is a great sport among the students of Dartmouth College at Hanover, New Hampshire. (Fig. 258.)

316. **Agriculture and lumbering.**—There is very little agriculture in this district, except in a few spots. Not only is the growing season too short, but the land is too rough for farming. But it is a good country for grass, and Vermont has long been famous for its fine merino sheep, its horses, and its dairy farms. In the Aroostook Valley in northeastern Maine is a tract of sandy loam soil which is easy to cultivate. The cool, moist summer exactly suits the potato, and this section has become a famous potato region, sending seed potatoes to many states lying farther south.

Most of the Northeastern Highland district is a great forest. Even the farms are for the most part woodland, and many of them have large groves of maple trees from which sugar is made.

The income of the people comes largely from forests, which furnish lumber, pulp wood, and paper. Each winter scores of lumber camps are built in the woods. There, men are busy chopping trees and hauling logs to the stream banks. Each spring the streams carry logs out in all directions to the sawmills and papermills. Bangor and

Augusta in Maine have many such mills busy with the logs that float down from the highlands. It is the same with towns in southern New Brunswick, and with towns on the Gulf of St. Lawrence and the St. Lawrence River. Most of the towns within this region cluster around papermills, built at some place where a waterfall furnishes the power to grind spruce logs into the pulp from which news paper is made.

In the winter of 1919-1920 the snow was so deep in this region that trains could not reach the papermills for weeks at a time. Many newspapers in New York, Philadelphia, and other cities had to reduce their size because the papermill towns of New England and eastern Canada could not ship paper as usual.

317. The resort business.—Few parts of the United States equal New England in the variety of vacations that a short journey may furnish. The shores of Cape Cod, on the tip of the Coastal Plain, furnish a flat coast with the charm of the sandy beach. From Boston northward to the Gulf of St. Lawrence the Maritime District has a very rugged, rocky coast. Inland throughout the whole maritime region are cozy farmhouses by



Photo. Publishers' Photo Service, N. Y.

Fig. 258. New York boy and girls enjoying winter sports in the Adirondacks. Could you slide down hill on skis and keep your balance?

stream and pond. The highland district offers wilder scenes. It invites those who wish to go where mail and newspapers can not follow them, and where leaping trout make the sportsman rise before dawn to creep stealthily up to clear pools.

Each summer thousands of people may be found canoeing, tenting, and tramping along the streams, lakes, and hills in the solitude of the north woods. There they can know for a few days or weeks how it feels to be in a wild place far from town. Here also, in locations of great beauty, are many large summer hotels, and in scores of permanent camps, thousands of schoolboys and school-girls have a few delightful weeks of swimming, boating, and outdoor life.

318. Future.—Is this a place where many people will live all the year? In much of it there are now not more than two or three people to the square mile. Will this change? Three words describe the future of this region: forests, water power, recreation. Tell how an increase of population in New York City and in the New England Maritime District will influence each of these three things in the highlands.

Most of the forests have been cut over once or twice, and some of them have been ruined by fire. Some of the wooded land now belongs to paper companies that take excellent care of their forests, because they must have wood to keep their mills going. The United States Government has begun to buy some of the forest land that private owners will not protect from fire, and much of it will doubtless become a great national forest. The state of New York has taken a large part of the Adirondacks as a park for its people. Lovers of the great outdoors may paddle their canoes over the chains of lakes, may fish in the clear, rapid streams, or may climb the steep mountainsides; but as a condition of their life in the open they must beware of setting fire to the woods.

Into the spongy ground shaded by the forests of the Northeastern Highlands, the rain and the melted snow sink and are held. So gradually does water drain from this forest-earth that the streams which it supplies are clear, strong and constant. Many stream-valleys have been blocked by the material brought by the Great Glacier; in this way ponds and lakes are formed.

By damming their outlets, lakes, which are natural reservoirs, can be made to hold more water than they do now. How may this be useful? When New York City needed a greater water supply, it created a great lake in the Catskill Highland. In like manner many large cities of the future will draw clear cold water from these highlands. Some of the water may generate electricity in its descending course, to move the wheels of mills in distant places.

This land will invite many kinds of men. For a few months in summer and autumn the canoeist, the camper, the trumper, the fisherman, the hunter, the motorist, and the hotel guest will throng the land where for months at a time and for miles at a stretch, in the long, cold winter, the sound of a human voice is not heard—save that of the fur hunter, creeping stealthily after pelts, or that of the forester, protecting and studying his trees. Then at intervals many years apart

will come the lumbermen with noisy winter camp, loud halloo, and ringing ax. The winter stillness will be broken by the sound of falling trees. Thus men will harvest the crop of logs that has taken a half century or more to grow.

If we should have to use all of our land as closely as the Swiss do, what parts of this region might have a dairy industry?

Animals in this cold region have very good fur and fur farming, which has already begun, may become important. The Prince Edward Islanders (Sec. 247) have shown the way by raising black foxes with skins selling sometimes for \$1000. One mother fox has been known to sell for \$15,000, and to raise a litter of young that were worth \$10,000. Many millions of dollars are now invested in fox farms. Muskrats and other furbearers may also be domesticated.

QUESTIONS

1. Why are these mountains a land of forests and not of farms? a vacation land? a land with great water-power possibilities?
2. Plan a pleasure trip to this region.
3. Name and locate three mountain groups within the area.
4. What products do the people of this land produce to sell to the other regions of the United States?
5. How may they have helped to furnish you with your reading?
6. What has your region to send them in return for their service to you? How high is Mt. Washington? (Fig. 216.)
7. Make the following comparisons:

TOPIC.	LOCATION AND BOUNDARIES.	CHARACTER OF SURFACE.	CHIEF PRODUCTS.	IMPORTANCE.
Appalachian Ridges and Valleys.				
Appalachian Plateau. Northeastern Highland.				
Ozark-Ouachita Highland.				

8. What natural conditions in parts of these highlands help the farmers to produce merino sheep and fine horses?
9. Name some sports the students at Dartmouth College enjoy which are denied to the students at the University of California. (Fig. 258.)

10. Were you given a year's vacation, which land would you choose—the Northeastern Highlands or Southern California? Give three good reasons for your answer.

11. What are seed potatoes? Can you suggest why many farmers in eastern United States market their entire potato crop, and, for next year's planting, buy seed potatoes from the Aroostook Valley, Maine?



© A. E. Young, Soo, Mich.

Fig. 259. Lake steamers passing through the locks at Sault Ste. Marie, Michigan. You see boats standing at different levels. The boat at the left has a gate in front of it which we can see, and one behind it which we cannot see. Big valves in the gate nearest us open, and let the water out so that the ship settles down to the lower level. The gate then opens and the boat steams away. Perhaps you can show this by a drawing. Also show how the boat goes up the locks. Which end of the boat nearest you holds the crew? the machinery?

THE TRADE ROUTE REGIONS

THE BASIN OF THE ST. LAWRENCE AND THE GREAT LAKES

PART I.—THE ST. LAWRENCE VALLEY AND THE LOWER LAKE DISTRICT

319. A long trade route region.—It is a long way from Duluth and Chicago past Detroit, Montreal; and Quebec to the lower end of the Gulf of St. Lawrence; but all parts of the region are much alike in their great dependence on trade, and also in their climate and agriculture.

What regions bound the St. Lawrence Valley and the Lower Lake District? All of this region is lowland, except the north-western part, which we call the Upper Lake District.

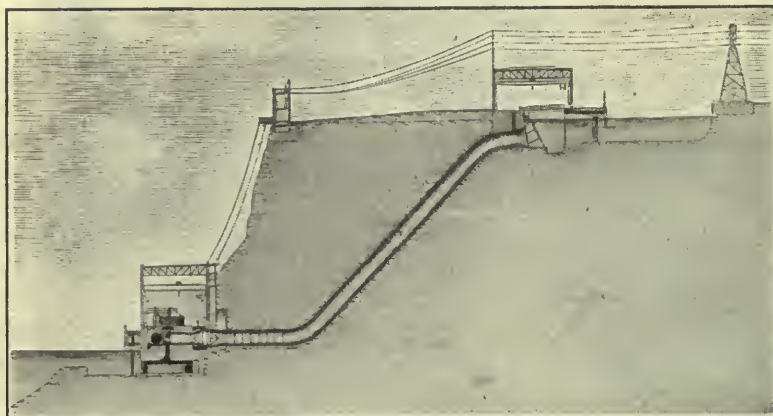
320. The effects of the Great Glacier.—The Great Lakes form the largest group of lakes in the world. Lake Superior is the largest body of fresh water in the world. These lakes were made by the great ice mass that once pushed its way southward

over this part of North America. The moving mass of ice scooped out great, deep holes (Fig. 262). The dirt from the holes, carried along by the ice, dammed up the old channels of streams (Sec. 314). When the glacier filled up the St. Lawrence Valley, the waters from the melting ice formed a large lake in front of the glacier. The mud and sand deposited on the bottoms of these old lakes now make fine agricultural soils along the south shores of Lakes Ontario, Erie, and Michigan.

As the ice front changed, the water found different outlets. At one time the waters of Lake Superior flowed south into the Mississippi at a point north of St. Paul. The waters of Lake Michigan flowed down the Illinois River into the Mississippi. Lake Erie waters flowed to the Ohio River. Later, as the glacier melted still more,



Fig. 260. The Basin of the St. Lawrence and the Great Lakes.



Courtesy Niagara Falls Power Co.

Fig. 261. Cross section of a Niagara Falls power plant. Water from Niagara River flows through intake at top to waterwheel at bottom, developing 10,000 horsepower. Waterwheel drives dynamo above it on same shaft. Electric transmission line carries power to Buffalo, Rochester, and Syracuse.

Lake Erie waters flowed across New York by way of the Mohawk, and finally they found still another new channel by tumbling over a ledge of rock near Lake Ontario. The swiftly-flowing stream cut the edge of the ledge, and gradually wore the rock away, until to-day the falls are at Niagara instead of at the place where Lewiston now stands. Measure on the map (Fig. 204) the length of the river channel below Niagara Falls. See in Fig. 262 how great the difference in level is between Lake Erie and Lake Ontario.

The Niagara River is a very young river flowing through a narrow gorge. (Figs. 142, 146, 147.) Niagara Falls, one of the wonders of the earth, is visited by thousands of tourists from all parts of the world. Niagara Falls is to-day developing more hydroelectric power than any other waterfall. (Fig. 261.)

In this region the glacier has (a) helped man to trade by making waterways; (b) put men into factories by giving them water power; (c) made farming easier by making smooth plains on old lake beds; (d) made farming harder than in some other regions because it left much of the region rolling and hilly and dotted with many small lakes. For this reason, a hundred-acre farm near the Great Lakes or

along the St. Lawrence may have some fields that are too hilly or stony or swampy to plow.

321. Transportation and cities.—Because the Great Lakes and the St. Lawrence River provide a trade route, trading and manufacturing industries have been developed until they support more people than do the farms. In this region the lake steamers have caused many cities to grow. It is a curious thing, this lake steamer. It is like a great

iron box with a flat bottom. (Fig. 281.) It has a little house in one end full of machinery, and another little house in the other end where the crew live. There are hundreds of these black, smoking freight boxes, which are really floating warehouses. Many of them carry 10,000 tons of freight from the far ends of Lake Superior or Michigan to the lower end of Lake Erie. The Welland Canal, by way of which boats go from Lake Erie to Lake Ontario, is large enough to allow only boats of 2,500-ton capacity to pass through, but there are plans for enlarging it. When it has been improved, the cargoes of the large boats will not have to be unloaded at one end of the canal and reloaded, but will pass directly through the canal in the big ships to their destinations. Look at the New York Barge Canal (Fig. 204) and explain how the Great Lakes route has two sea ends, and why Montreal and Quebec are important commercial cities. The great drawback to the route is that the river and all the

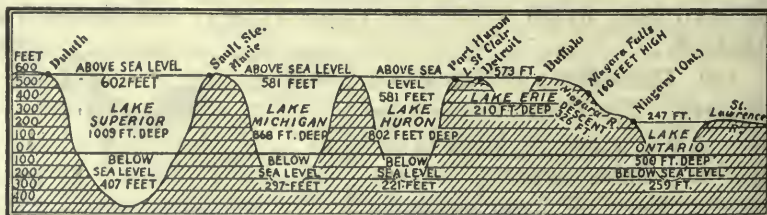


Fig. 262. A diagram showing sea level and the depth of the Great Lakes. How deep is each lake? Between which two is the difference in level greatest? How long is the river which connects Erie and Ontario? (Fig. 204.)

canals are frozen for several months each winter. Fortunately the seaports are not frozen more than a day or two at a time.

If we examine the western ends of the Great Lakes route, we see that cities have grown up wherever the lakes reach into the good country. What is the population of each of eight American cities on these lakes?

The lake steamer carries freight more cheaply than a train. Explain how that fact has caused the lake cities to be larger than the inland cities.

Chicago is the second city of America in size because, like New York, it is a center for many trade routes. Chicago is larger than Toledo or Duluth chiefly because it is the trade center for more good farmland than either of the other cities. It has been made not only by the lake, but also by the land. (Figs. 264, 308, 494.) Chicago is on the edge of the Lake Region, yet the lakes make it the greatest center of trade with the rich region of the Prairie Corn and Small Grain Belt. This region sends to Chicago many thousands of meat animals for the packing-plants, and many millions of bushels of grain to be forwarded over the lakes. In return, Chicago sends machinery and all kinds of supplies back to the farming country. Chicago and, to a lesser extent, all the other lake cities are really gateways through which streams of goods are flowing in both directions. Raw materials are going east and finished products are going west.

Being centrally located in the United States, Chicago is a good place for mail-order houses. (Figs. 308, 494.) All the people of the country can be more quickly reached by mail from this point than from any other.

In the summer season some of the produce that comes down the lakes from Chicago and other American cities is forwarded to Europe from the ports of Montreal and Quebec. It is a great hindrance to trade that the produce of the Lake District and of the St. Lawrence Valley must go overland to the Atlantic ports for nearly five months when the river is icebound.

322. Population.—The lake region is the



Fig. 263. State Street, in the heart of Chicago. See if an encyclopedia will tell you what was here one hundred years ago.

most northerly part of eastern North America where many people are living, and it has many kinds of people in it. Quebec was once a French colony. The people still speak French, and many refuse to learn English, or to speak it when they know it. Ontario was settled by British people, and they retain English ideas and ways of living. Michigan was settled by Yankees from New York and New England. The same kind of people also settled in Wisconsin. Later many Germans, Danes, and Poles settled there. A great many people have recently come from many countries in Europe to work in the mining towns near the west end of Lake Superior, and to live in Chicago, Detroit, Cleveland, and other big cities.

323. Transportation helps make manufacturing.—The lake cities are busy with factories as well as with trade. The lake steamer that carries ore, grain, lumber, meat, and copper eastward, often brings on its return



Fig. 264. An airman's view of Chicago. Compare its harbor, made by a breakwater, with that of New York (Fig. 278). Into what river does the drainage-canal water flow? (Fig. 54.) Chicago water comes from far out in the lake at the cribs (screened boxes where the water enters pipes). Find these cribs in the picture.

journey cargoes of Pennsylvania coal from Buffalo, Cleveland, Erie, or Ashtabula.

The lake shores produce the materials for making machinery, and Chicago, the trade center of the greatest agricultural district in the world, is also the greatest center in the world for the manufacture of agricultural machinery. Such products are so bulky that they need to be made as near as possible to the place where they are to be used. This gives Chicago an advantage over distant places.

To supply Chicago with steel, a new city was started near by at Gary, Indiana. Here, on a waste of sand, the largest steel plant in the world was built. A harbor was dug out of the sand. Here steamers loaded with iron ore from Lake Superior can run into docks directly beside the iron furnaces. At this big plant the newly-melted iron runs into little cars, and is carried, still molten, to the steel furnaces. There it is changed to steel, and sent on as a great white-hot chunk to the rolling mill, to be rolled out into steel rails for railroad and trolley tracks, or girders for bridges and skyscrapers, or billets (chunks) for the wire mill or the nail mill. A thousand different factories use the product of this one great plant.

Since Chicago is so near to the stock farms of the corn-growing prairies, it slaughters more meat animals than any other city in the world. An English traveler said: "To watch an animal from the pen to the tin (can) is an extraordinary experience. You see it killed; it falls; a conveyor carries it away; it is flayed (skinned) while you wait; it disappears. Then, suddenly, it is an open carcass; it passes the veterinary; in a few seconds it is cut up, and hurriedly you follow the dwindling carcass that is no longer an ox, but fragments of meat; you see the meat shredded; in another room the manicured girls are filling the shreds into tins, and the tin is closed and labeled. A superior force, which is called organized industry, has cut up the cattle on a traveling belt and carried them away."

Milwaukee, like Chicago, is a machinery and trade center; it has also large factories manufacturing leather and many other things.

Cleveland, like Buffalo, is a city of machine shops, steel plants, and many other industries using iron and wood. Cleveland and the smaller lake ports near it forward each year millions of tons of iron ore to Pittsburgh, Youngstown, Sharon, and other iron centers.

324. Standardization and the machinery

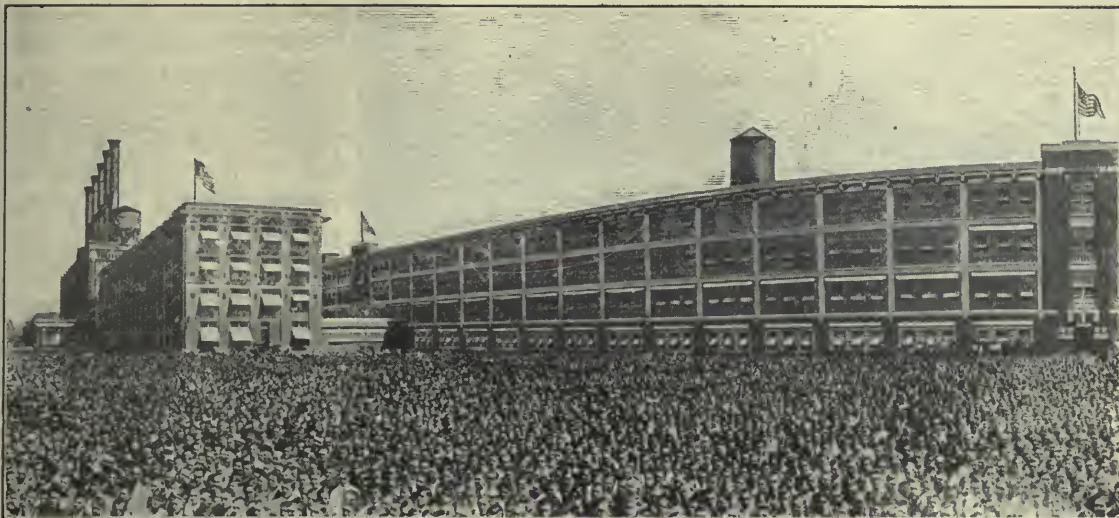


Fig. 265. The Ford Motor Co. plant, Detroit, Michigan, and some of the workers. Do these people help you?

industry.—More than half the automobiles in the world are made in a little triangle of land between Saginaw Bay, Chicago, and Cleveland.

This industry, like so many of our other manufacturing industries, has grown up because methods called standardization and specialization have been used. Standardized things are all made alike, and thus fit the place for which they were intended. For instance, you can buy cartridges that will fit your gun; you do not need to have them made especially to fit it. There are standardized needles and records that will fit your phonograph. You can buy ready made a new piece that will replace a broken part in your automobile, your typewriter, your reaper, your bicycle, or almost any machine in your factory. A short time ago when a part was broken, another had to be made to replace it. That was very hard to do, and made things costly. Good mechanics were then needed in every part of the country where machinery was used.

Now that standardization has come, one little town in Michigan has a plant that makes automobile rims. Another town makes axles; another, doors; another, bodies; another, bearings; another, lamps; and so on, until almost every town for many miles around Detroit is busy with plants

making the parts of automobiles. These parts may be shipped to factories everywhere, and used on twenty different kinds of cars.

325. Specialization and the machinery industry.—When a factory has begun making a few standardized things, a second great advantage appears, viz.: standardized things can be made easily and cheaply. Therefore the factory specializes on one or at most a few standardized things. These two practices have given us this age of cheap machinery.

326. The great automobile center.—By the use of standardized parts, manufacturing becomes a kind of assembling. Perhaps the most wonderful plant of this kind in the world is the Ford automobile plant, where you can see a car put together in a few minutes by a long row of workmen. First, two axles and a frame come down a chute in front of several men, each of whom turns a bolt or two, and then an endless conveyor takes the frame and carries it forward to the next man. In this manner the car passes in front of a long line of men, each of whom receives from above or from one side a part which he fastens to the frame. One man puts on completed wheels from the wheel department; another, the case that covers the driving shaft; another, springs; another, some other



Fig. 266. Cleveland harbor. Notice the lighthouses; the protecting breakwater; a lake steamer sailing out; the many railroad tracks; coal docks with dumping apparatus. (Fig. 281.)

© Ewing Galloway, N. Y.

part. Finally a completed engine from the engine department swings out on a little crane, is lowered to the car, and quickly bolted fast. Next the gasoline tank with gasoline in it is bolted fast, and the skeleton car that has not yet received its body is ready to run with its own power, and to be tested out. After the test the car is taken apart and packed up to be shipped, perhaps to the very end of the earth, and there it is repaired with pieces that are sent out from the home plant.

The automobile industry of Detroit, Toledo, and the many smaller cities, has grown with such great speed that between 1910 and 1920, Detroit, the automobile center, increased from 465,766 to 993,678 in population, and from ninth to fourth in rank among the cities of the United States. Does this industry affect Detroit alone? Can one part of our country have good business all by itself? In the spring of 1921, the manager of the Hood River Apple Growers' Association complained that Detroit was buying only one carload of boxed apples a week, because the automobile business was dull and the workers were not spending money for apples. They had been buying five carloads a day when business was good.

327. Future.—Will the demand for automobiles and other machinery continue? Will these industries move away from the Lake District where they are so thoroughly established? Every city between Buffalo

and Chicago, by way of either Detroit or Cleveland, is exactly on the line of a railroad running fast trains between the east and the west. Iron and wood of the upper lakes and coal of the lower lakes can come by water to every lake city. These cities are on the very edge of the greatest food-producing region in America. They have a wholesome climate, and the summer is

neither so hot nor so long as that of regions to the south. These cities being located in a land of lakes, both big and little, are provided with coolness and recreation as well as with cheap freight rates. Increasing population and production in the regions around the lakes means, of course, more traffic over the lakes. Meat, grain, and farm supplies will continue to move as they do now.

328. How the lakes make fruit crops.—The Lower Lake District is great in trade, great in manufacture, and it also has an interesting agriculture.

Owing to the lakes, this region rivals California in the amount of fruit it produces. One of the greatest dangers to fruit crops in the United States is the spring frost that kills the buds and flowers of the blooming trees. The lakes reduce the danger from spring freezing, because they are full of ice and cold water which keep the land near them cool until the end of May. Trees do not put forth leaves and buds in cool weather, so the danger of frosts is mostly past before orchards along the shores of Lakes Ontario and Erie begin to bud. Often there are good crops of fruit near the lakes in the same season when frosts kill the crop twenty miles inland. For this reason, orchards of apples, peaches, and cherries almost touch each other for miles and miles along the southern shore of Lake Ontario.

In June and July, men and women, boys and girls are picking wagonloads of cher-

ries to send to neighboring canneries. In August and September, peaches are picked, graded, packed in boxes and baskets, and sent off by carloads to the city markets. After the peaches are picked, the apple harvest begins, and for a month or six weeks everyone who can be persuaded to work is picking and sorting apples.

Thousands of carloads of apples are shipped from western New York to the markets and cold-storage plants of cities as far distant as Boston, New Orleans, and Minneapolis.

Across the Niagara River, in the little peninsula between Lakes Ontario, Erie, and Huron, the Canadians are likewise busy with crops of fruit.

The waters of Lake Michigan also protect the many orchards of peaches, apples, and cherries that grow close together along the eastern shore. One morning in January, 1920, the thermometer at Grand Haven, Michigan, was 22° F., while directly across the lake at Milwaukee it was 0°. At this time the lake surface had no ice and the water temperature was, therefore, only 32°, so that the slow-blowing southwesterly wind was warmed by the water in crossing the lake. A body of water as small as Green Bay protects fruit crops, and the little peninsula between Green Bay and Lake Michigan has many cherry orchards. Cherries for the



Photo. J. C. Allen

Fig. 268. Cornfields, dairy barns, and silos at Delavan, Wis.

canning factory are the chief industry of the Leelanau Peninsula just across the lake.

The grape crop shows another example of the influence of water on climate and crops. Nearly all of the grapes grown east of California, for shipment to market, are produced along the north and south shores of Lake Erie, especially along the eastern end, and along the several long, slender lakes, called finger lakes, in west central New York. (Figs. 30, 204.) In these districts vineyards often join each other for miles along the lake shores. If you live east of the Mississippi, read the address on a basket of grapes that is for sale in October or November.

Fruit crops are also grown on the islands in Lake Erie near Sandusky, and on the two peninsulas that reach into Lake Superior.

329. Northern agriculture.—Although in its southern part, this district touches the Prairie Corn and Small Grain Belt, only a little corn is grown in it. The coolness of the lake waters causes corn to be absent from the lake-shore farms, although it may be grown only a few miles farther inland. Instead of corn, most of the farmers grow potatoes, sugar beets, and navy beans (Fig. 42). These three crops do well where it is too cool for corn. Many farmers also grow fields of peas, cabbage, tomatoes, and sugar corn (Sec. 247), all of which are taken to the canneries that are so common in the Ontario plain and in southern Michigan and lower Wisconsin. More work is required to grow these crops than to grow corn, oats, and hay, but the return per acre is greater. For this reason we say the agriculture is more

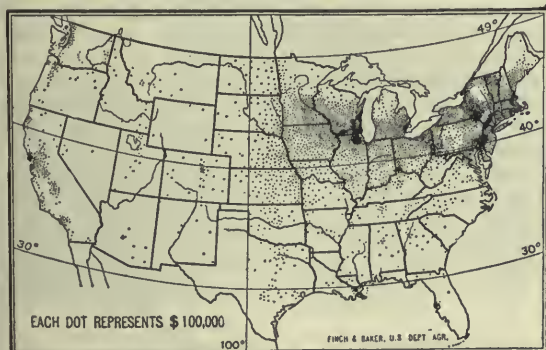


Fig. 267. Value of dairy products produced for sale. Compare the two ends of the Appalachian Plateau. Find the Adirondacks; the Upper Lake District.

intensive than that of the corn, oats, and hay farms.

330. Dairying.—Next to the fruit industry and the trucking industry, dairying is the chief industry of the entire region from Quebec to the suburbs of Minneapolis and St. Paul. Why do the farmers in the whole of this long region keep cows? Because cows will help the farmer to make a living on a small, rough farm in a place where the winter is long and the summer is cool. On the wide, level stretches of Kansas and Texas, a farmer can make his living by selling grain or feeding meat animals; but in the sections made hilly by glaciers, a farmer having a hundred acres of land often has only fifty acres that are fit to plow, the rest being woodlands or pasture. That farmer keeps cows, and has milk to sell daily instead of meat to sell once a year. The dairy farm has a pasture field, a hay field, an oat field, and sometimes a field of beets of a big, coarse kind that cattle like to eat. The only thing sold from a farm like this is milk, and from time to time some calves or cows.

331. The downs and ups of agriculture.—Between 1910 and 1920, thousands of farms in this region were abandoned because the people could make more money in the automobile and other factories. As the number of our people increases, and the rising price of food makes us give more attention to farming, this section can greatly increase the amount of fruit and vegetables grown in the plains along the lakes. It can also produce many more potatoes and much more butter and cheese in the hilly farms of Wisconsin and Michigan, of Ontario and Quebec.

We find the dairying industry in the part of New York west of the Adirondacks, and in the part of Vermont that drains toward the St. Lawrence. It is especially important in the St. Lawrence Valley and Wisconsin.

332. Government aid to industry.—In



Courtesy Minnesota Forest Service
Fig. 269. Map showing the west end of Lake Superior and the area burned over by the forest fires of one year.

dairying we can see how teamwork, or organization, helps industry. Wisconsin has been the leading dairying state in the United States, partly because the state agricultural college has given so many extension courses in dairying, that nearly every farmer in the state knows how to take care of cows, milk, and butter. Butter and cheese from Wisconsin and Minnesota are used in

thousands of homes in New England and the Middle Atlantic States. But the Canadians have beaten the Americans in the export of cheese to Europe, because they guarantee the quality of their goods. In the United States, any person can send what he pleases to Europe. Some people have sent cheeses that were good on the outside but poor on the inside, so that the name "Yankee Cheese" means in England bad cheese. The Canadian Government will not let any cheese go out unless it has been officially inspected and stamped. This guarantee has won the market, and Ontario and Quebec alone export much more cheese than the whole of the United States.

QUESTIONS.

1. From your charts and pictures make a list of the products of this region, grouping them as follows: (a) Farm products; (b) Orchard products; (c) Dairy products; (d) Manufactured products. Add to the list any commodity produced by the region but not illustrated in the text. 2. Name the place in this region you most desire to visit. Why? 3. How many names of automobiles can you quickly recall? Where was each car manufactured? 4. Why were so many produced in the Great Lakes Region? 5. Were you planting an orchard, would you plant it near Milwaukee or Muskegon? Give some good reasons for your answer. 6. How do you account for the enor-



Courtesy Finch and Baker, U. S. Dept. Agr.
Fig. 270. Dairy cows in Canada.

mous growth (Figs. 237, 267, 268, 270) of the dairy industry about the Great Lakes?

7. Were it possible, would you recommend that the Great Lakes be drained and their beds be converted into farms? Give three good reasons for your answer. 8. From Fig. 210 suggest two possible routes by which ocean-going steamers may in the future reach Chicago. What improvements must be made in each route before this can be possible? 9. Tell something about standardized machinery. Did George Washington have any? Does the President now? 10. Give three good reasons why Chicago is second in size among the cities of the United States. 11. Why does most of the lake trade go eastward through the Valley of the Mohawk rather than by way of the St. Lawrence?

12. Explain how a large lake makes climate cooler and also warmer?

13. Complete the following outline on the cities in this region:

NAME OF CITY.	LOCATION.	FACTS I SHOULD REMEMBER.

14. Debate in your class the following question: Resolved, that the governments of the United States and Canada set aside Niagara Falls as an international park, and permit no more of the river's waters to be diverted for power purposes.

PART II.—THE UPPER LAKE REGION

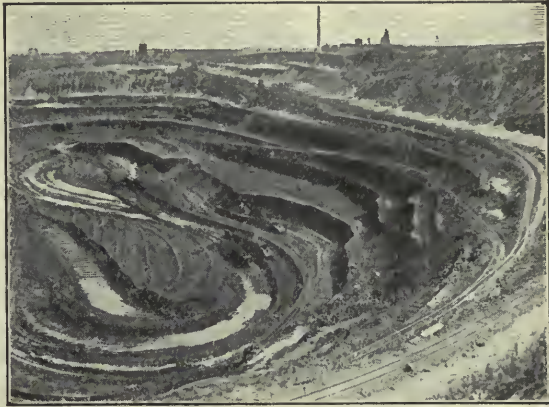
333. A region desolated but rich.—The Upper Lake Region is a land of old, worn-down mountains, of very hard rocks, and of shallow soil. The glaciers have scraped the surface, piled stones upon it, and made thousands of swamps, ponds, and lakes. Minnesota alone is said to have ten thousand lakes and ponds.

It was once a land of fine forests, but most of the big trees have been cut. Sometimes forest fires, leaping from treetop to treetop,



Courtesy U. S. Dept. Agr.

Fig. 271. This desert made by American neglect, was once a rich forest of pine. Dark, spongy earth once covered the stones in front of the stump. Tell what has happened. What would have prevented it? (Fig. 410.)



Courtesy Oliver Iron Mining Co.

Fig. 272. A steam shovel loading freight cars in an open pit iron mine on the Mesaba Range, Minn. How does the freight train get out of the hole?

have burned forests, railroads, towns, and even people. In some places the fires killed every tree, and the earth, no longer held in place by roots, has been washed away, leaving bare round knobs of granite on which sometimes the stumps of the original forests still stand, dry as old bones. Lumbering still goes on, and much furniture is made in the cities of the lower peninsula of Michigan, some of which are in the Lower Lake District.

Some of the once forested land is being turned into farms, but the rough land here, as elsewhere, naturally belongs in forests. Parts of the cut-over land have already been taken by the states as state forests, and by the nation as national forests, but here, as in many other parts of our country, it will take many, many years of care to make these forests half as good as they were when the white men first began chopping at our woodlands, the richest in the world.

334. Mines.—The long peninsula that projects into Lake Superior has many copper mines, and for a long time Michigan was the leading copper-producing state in the country, but it has since been surpassed by Montana and Arizona.

The greatest iron-mining region in the world is near the western end of Lake Superior. Here many thousands of newly-arrived Europeans live in prosperous mining towns scattered around in the wild woods. There are whole mountain ranges of iron ore



Fig. 273. A map showing the movement of iron ore from the mines of the Upper Lake Region to the furnaces. Note that the stream of ore grows steadily less as various cities draw from it. Where is the iron from this ore used?

so soft and so near the surface that the steam-shovel can scoop it up by the ton and drop it into cars, which carry it to the piers on Lake Superior. At the pier the brakeman pulls a lever which opens the bottom of the car, so that the ore drops through into bins. A big steamer comes alongside, and in a few hours ten thousand tons of ore drop with a roaring noise into the great hold, and the ship steams away to the Lower Lakes. (Figs. 259, 281.)

Four American ports on Lake Superior ship nearly fifty million tons of iron ore a year, as much as four-fifths of the total production of the United States, and more than the entire production of any two foreign countries.

335. Cities.—Name the port cities at the western part of Lake Superior. We can think of these Lake Superior ports as funnels through which the northwest pours its products to the eastward. These products—grain, iron ore, and lumber—are very bulky and are mostly handled by machinery, and, therefore, do not employ so many people as are needed to handle manufactures.

336. Future.—Will the iron-ore business increase? What will be the influence of more population and more business in the Northern Wheat Belt upon the cities near the western end of Lake Superior? Some manufacturing

has already begun in these cities.

What will be the results if the Hudson Bay route to Europe succeeds as a grain carrier? (Sec. 101.) If the plan for a ship canal from Georgian Bay to the St. Lawrence comes to pass? Or if the enlarged Welland Canal permits the passage of ocean steamships?

QUESTIONS

1. What explanation can you offer for the many small lakes and swamps dotting this section?
2. Name another region which you have studied where extensive areas must be drained before they can be cultivated.
3. Would you like to live near some small lakes? Why?
4. What products will the lock tender's boy in the Soo Canal see the lake steamers carry on their voyage eastward? westward?
5. Compare the Lake Districts as follows:

TOPIC.	UPPER LAKE DISTRICT.	LOWER LAKE DISTRICT.
Surface.....		
Soil.....		
Chief industries...		
Products of farms...		
Products of forests..		
Products of mines..		
Products of mills...		

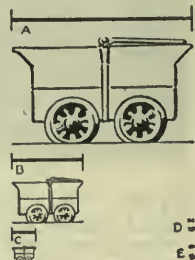
6. Give some points of similarity between the method of mining iron (Fig. 272) and the mining of copper (Fig. 150 B). 7. Name and locate four important cities of the Upper Lake Region. 8. What raw materials constitute the bulk of their trade? 9. How does their position account for their growth?

10. Which canal, the Soo or Welland, handles the bulk of the lake traffic? Why? 11. Write a letter as from the United States Bureau of Forestry to the people of the upper lakes, telling what their forest areas need. 12. Read one of Stewart Edward White's interesting lumber stories of Michigan, and find out what were the chief kinds of lumber secured.

Fig. 274. The five leading iron ore producing states (1919-20).

	Tons
A. Minnesota.....	37,860,000
B. Michigan.....	16,350,000
C. Alabama.....	5,440,000
D. Wisconsin.....	930,000
E. New York.....	890,000

How much came from the Lake Superior District? How much from the Great Appalachian Valley?



d:
e:

THE ERIE CANAL BELT

337. Where it is.—With your finger, trace on the map the location of the Erie Canal Belt. (Fig. 210.) What great bodies of water are at its ends? Find cities at the western end. Find cities at the southeastern end. (Fig. 204.)

338. The kind of region it is.—Think a moment about the great volume of trade in the St. Lawrence and Lower Lake Regions. Some of these goods pass out through the St. Lawrence River, but a great many more reach the sea by way of the Erie Canal Belt.

This region, then, like that of the Great Lakes, is a trade-route region. Try to see a picture of goods and raw materials continually passing into this region from other regions. Imagine millions of people working to keep these goods moving, and thousands of boats and trains carrying the goods from one end of the region to the other end. If you can think of the Erie Canal Belt as

an avenue or artery along which, by night as well as by day, goods and raw materials are forever passing, passing, you will realize

what a very busy region it is. Because of this and other reasons, the Erie Canal Belt is also a great industrial and manufacturing region. Numerous thriving cities are situated within its bounds.

339. New York City.—We shall need to study New York City from three points of view: (1) As a crowded city, the center of a metropolitan district of many cities. (2) As a great port. (3) As a great manufacturing center.

(1) *New York, the crowded city.*—The City of New York was founded at the lower end of Manhattan Island. In 1800 it had 60,000 people; Philadelphia then had 69,000; Baltimore, 26,000. The people of New York thought that it would be a great advantage to them if there were a trade route between the Great Lakes and their city, because then New York would become the gateway of



Photo. Brown Bros., N. Y.

Fig. 276. An airplane view of Ellis Island, New York harbor, where immigrants land. What do you see in the background?

the commerce of the Lake Regions. So they set to work to build the Erie Canal, which would connect the Hudson River with Lake Erie. The task was completed in 1825. The first boat to go through the Erie Canal brought a cask of water from Lake Erie, and the governor of the state, with great ceremony, emptied the water into the Atlantic Ocean as a symbol of the union of the two bodies of water. The canal has recently been rebuilt so that it can carry much larger boats. It is now called the Barge Canal.

Thus did New York City secure the best route to the Great Lakes, and then the city began to grow more rapidly than any other in America. To-day it is one of the most crowded places in the world.

There are so many people and so little room in this city, that families rarely have separate homes. Instead, they live in buildings that are ten or twelve stories high. Each story is divided



Photo. Keystone View Co.

Fig. 277. General Grant's Tomb overlooking the Hudson, on the west side of Manhattan Island, New York City. What is there in this picture to remind you of a cause of New York's commercial greatness? (Fig. 278.)



Fig. 275. The Erie Canal Belt.



Fig. 278. New York and surrounding cities as the airman sees them. Trace the limits of Greater New York. Point out its five boroughs. Which are on islands? What two seashore resorts are within the city limits? Point out some drowned valleys. Why has a new harbor in Jamaica Bay been planned? Trace a state boundary. Where would you expect to find lighthouses?

into several family apartments. Most New York children have only the city street for a playground, unless they are fortunate enough to live near a park or public playground.

Most of the steamers that carry passengers from various parts of Europe to the United States arrive at New York, so most of our immigrants land there. Sometimes 5,000 and even 10,000 have arrived in a single day. Many stay in New York, so the city contains many foreign-born people, representing fifty different races. More Italians live in New York City than in any Italian city. In one section of New York the people speak Greek; in another, Spanish; in another, Rumanian; in another, French; in another, German; in another, Chinese; in another, Russian. There are restaurants that serve food cooked as it is cooked in the home countries. The children from these foreign colonies go to the public schools, where they learn English, and soon become Americans.

340. A cluster of cities.—There was not enough room on Manhattan Island for so many people, so towns sprang up on Long Island and on the mainlands of New York State and New Jersey. Now the City of Greater New York includes Brooklyn and Queens to the east, Richmond to the south, and the Bronx to the north.

Most of the people who live in this cluster of cities, and many others besides, go each day to work in Manhattan. Every means of transportation is taxed by big crowds. Long trains of cars roar through the New York subways every two minutes during the morning and afternoon hours when travel is greatest. Every seat of the long train is filled, and people stand packed in the aisles. Sometimes the guards crowd the people into the cars until the doors can scarcely be shut.

(2) A great port.—First, we need to consider the water front, of which Manhattan Island and Brooklyn have many miles.

Wharves and docks line much of this water front; this makes a very fine place for ships to come. Just as the people of Brooklyn, the Bronx, and the neighboring cities and suburbs rush to Manhattan Island every day, so the ships from almost every land steam past Sandy Hook lighthouse and into the splendid harbor. Here the ocean steamer meets coastwise vessel, river boat, barge, freight car, express car, truck, and wagon.

Is it any wonder that on the wharves and docks and in the warehouses of the city you will find assembled great stores of wheat, meat, corn, flour, and other commodities brought there from the rich interior of our continent? The goods came by many railroads and by way of the Great Lakes, the Hudson River, and the Barge Canal. The Mohawk River cuts through the wall of the highlands to the northwest of New York, and furnishes an open highway for trade by boat and by rail. This water route from the interior to New York City can carry freight more cheaply than the railroads can. By water and by rail great masses of goods arrive at the port of New York for export.

Ships from everywhere arrive at the docks to take goods away, and these ships bring with them the things that we import. Because shiploads of cloth, machinery, and the fine manufactures of Europe arrive in New York, it is the right place at which



Photo. Brown Bros., N. Y.

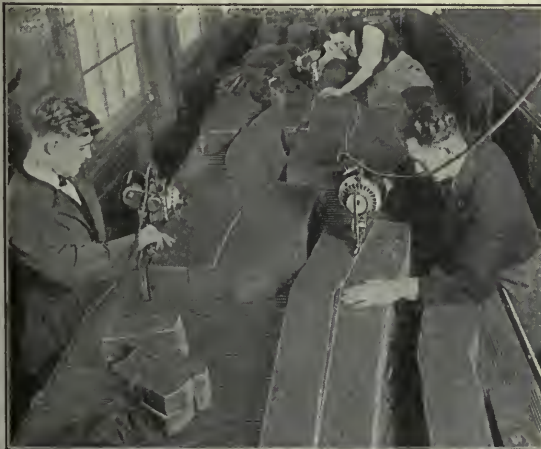
Fig. 280. A baseball game with Harvard, in front of the Library at Columbia University, New York City.

to build wholesale stores, where goods such as these can be bought and sold.

(3) *A great manufacturing center.*—Trade makes manufacture. Since New York became the greatest wholesale market in the country, it was naturally a good place for manufacturers to sell goods. This fact encouraged men to build factories there. The ships, railroads, and canals made it easy for manufacturers to get raw materials and for workers to get food. Thus New York has become the greatest manufacturing city in North America.

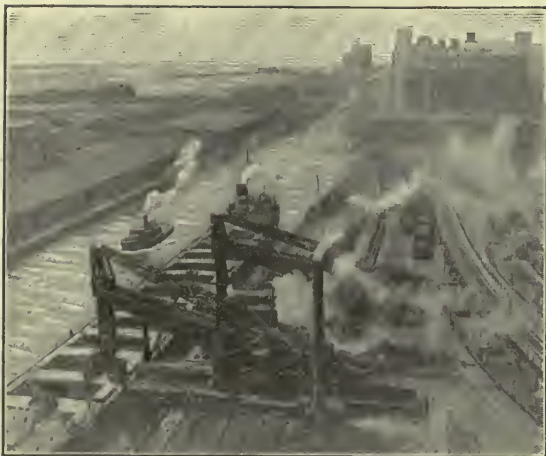
It is easy, too, to get coal for manufacturing, because the Pennsylvania coal fields are so near. Other advantages of location are healthful climate and near-by recreation, which help to keep people strong and vigorous. New York City is so close to the sea that it is cooler than many places farther inland. Seashore resorts on Long Island are within the city limits. People can go to Coney Island (Fig. 278) and to other shore places on trolley cars. Bathing beaches in New Jersey are also near by. Beautiful spots in the Adirondack and Appalachian plateaus and the many resorts of New England attract people for vacation trips.

341. *Industries.*—The chief industry of the City of New York is the clothing industry. The method of making a suit of clothes has been greatly changed since the time when a tailor made the whole suit. Now the work is so divided that forty people may do some-



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Fig. 279. Workers in a New York clothing factory cutting one hundred layers of cloth with the electric cutter. Why does this make suits cheaper?



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Fig. 281. Buffalo harbor. In the distance are the breakwater and the grain elevators. In the foreground an unloading machine is about to plunge its clam-shell grab bucket down into the hold of the long freight steamer to bring up five tons of ore.

thing to a suit before it is finished. A single worker runs an electric cutter that may cut out a hundred suits at once; another worker makes a part of a sleeve; another finishes the sleeve; another makes buttonholes; another sews on buttons; another finishes the collar. Thousands and tens of thousands of men and women are busy in New York City clothing factories, some of which are on upper floors on famous Broadway itself.

So many magazines, newspapers, and books are published in New York that the city is one of the greatest publishing centers in this country. So varied are the manufactures near New York, ranging from lead-pencils to steamships, that it would be hard to name something that is not manufactured near the mouth of the Hudson. All these industries help to make New York the huge city it is.

342. Skyscrapers.—To accommodate the great masses of workers, office buildings are often built to a height of twenty or thirty stories. The Woolworth Building has fifty-one floors of offices. It is so high that passengers must use two elevators to reach the top, changing cars at the fortieth floor.

343. Travelers.—Thousands of people from all parts of the country go to New York every year. They go to transact business,

and to see the sights of this rich, crowded, busy metropolis, and to walk along its streets. Broadway is so brightly lighted at night that it is called the Great White Way.

New York is the greatest travel center in the United States. Every day express trains leave for distant parts of our country: Key West, Eastport, Maine, San Diego, Seattle, and all big intermediate places. As the city is the leading port of the United States, its hotels are crowded with boat travelers, who are either going abroad or coming from some other port of the world.

344. Neighboring cities.—The many other cities which have grown up around the mouth of the Hudson all share the opportunities for trade and manufacture that are at New York. Across the Hudson, opposite New York, there is a settlement that seems to be one city, but it is so long that it is called by three names and has three city governments: Jersey City is the central part; Bayonne, the southern; and Hoboken, the northern. A little farther away, to the west, are the factory cities of Newark and Paterson; and scattered around are many suburban towns, from which each morning thousands of business men go to work in New York City.

345. A string of cities.—The great waterway which made so many large cities at the mouth of the Hudson has also caused cities to spring up, almost like a string of beads, along its entire course. Buffalo, at the west-



Fig. 282. Buffalo and its vicinity. Can you tell how the Erie Canal and the Barge Canal have made Buffalo the largest city of New York except New York City.

ern end, has become the second city of New York State, and the twelfth in the United States. Buffalo is a large city partly because so many people are needed to help with loading and unloading ships and cars of goods bound for some distant place. The manufactured goods (Sec. 340) and raw materials from foreign countries, such as sugar, wool, rubber, skins, varnish, and gums, come to New York at one end of this route. At Buffalo, the other end of this great trade route, lake steamers unload lumber and iron ore from the upper lakes; wheat from the Wheat Region; and corn, oats, and meat from the Central Farming Region. With all these raw materials, it is natural that Buffalo should have many manufactures of wood, iron, and machinery, as well as flour-milling and meat-packing industries.

The cities along the route from New York to Buffalo manufacture many interesting specialties. Troy makes nearly all the collars and cuffs that are used in the United States. There is a story that the industry started there because a clergyman's wife in that town made and sold collars that were not attached to shirts. This was such a practical idea that the collar industry grew in Troy.

At Cohoes, an enterprising man learned to hitch a knitting machine to a water wheel, and thus started power knitting mills. Now knitting mills give employment to many thousands in every large town along the Mohawk River, except Schenectady.

In Schenectady nearly everybody works in



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Fig. 284. A view of the Barge Canal crossing New York State. How many important things can you pick out in this picture?

machine shops, making locomotives and electrical machinery for use all over the United States and in many foreign countries.

A few miles away, near the foot of the Adirondacks, are the two towns of Johnstown and Gloversville. They were settled about 1750 by Scotch glovemakers, and to this day glove-making is the chief source of income there. Gloves are cut out by machinery in factories, and are then sent to the homes of the people, where they are finished on electric sewing machines.

At Solvay, a suburb of Syracuse, farther

to the westward, is the chief industry of this long narrow district that has a local supply of raw material. Salt found nearby is brought to the factory by gravity. Water flows through a pipe from a lake down into a salt well, dissolves some of the salt and flows out through another pipe line down to the factory. Chemical products are made from this salt.



Fig. 283. A view of the works of the General Electric Company at Schenectady, N. Y. Why is this a good location for a machine-manufacturing plant?



Photo, Brown Bros., N. Y.

Fig. 285. Court Street Bridge over the Genesee River at Rochester, N. Y. What do you see about this river that helps to explain why a city grew up here.

Still farther westward is Rochester, where the falls of the Genesee River give power at the same place that the canal gives transportation. This city, like New York, makes much fine clothing, and it is the greatest center in the world for the manufacture of cameras and photographic materials, and for growing young fruit trees.

346. Few farms.—The farms of the Hudson and the Mohawk valleys produce a great deal of milk and many apples. In Sections 328–331 we read about the farming on the lakeshore plain west of the Mohawk.

347. Resources for the future.—The advantages that have made the remarkable string of cities extending from the sea to the lake are permanent advantages. In this region it will continue to be easy to get raw materials for factories and food for the workers. From this region it will be easy to ship goods over the sea to foreign countries, and over the canal, the lakes, and the railroads to the interior of North America. Good drinking water for the cities is to be had in the neighboring highlands.

The Erie Canal Belt has good resources for power to turn its factory wheels. Electrical energy from power plants at Niagara Falls is now carried by wire over the whole section between Detroit on the west and Syracuse on the east. If New York and

the cities on the Hudson and the Mohawk grow tired of paying freight on coal from Pennsylvania, they can get power by wire from plants at the mouth of the Pittsburgh coal mine 300 miles distant, or by wire from water-power plants in the northeastern highlands 300 miles distant, or even from Niagara to the St. Lawrence. Power has been carried over 400 miles by wire from our western mountains. On a map, trace a circle that is 400 miles from New York as a center; Albany; Buffalo; Boston. What sources of power does each circle touch? (Fig. 261; Sec. 352.)

QUESTIONS

1. Fill blanks in the following sentences: The Erie Canal Belt is shaped somewhat like a carpenter's, with the city of at its western end, and at the eastern end. To the northeast lies the District and the Highland; to the southwest the and the Mountains and The region is drained by the and rivers. The River, which enters the Hudson at the city of, cuts a in the highlands, through which has been built the Many also make use of this gap. The important cities along the highway beginning at are, ..., ..., ..., and Some of the important products of this region are, ..., ..., and
2. If you lived in New York City, where would you like to go for a two weeks' vacation? 3. What five physical features have helped to make New York the world's metropolis? 4. Why do five-sixths of the population of New York State live in the counties bordering the Hudson and Mohawk rivers and the Barge Canal?



Photo. Underwood & Underwood, N. Y.

Fig. 286. Gold-seekers setting out from winter camp on the upper Yukon. What stories have you read of adventure in this region? Is life easy? This is the way some of the Great Northern Forest looks in winter.

THE NORTH LANDS AND ANTARCTIC

THE GREAT NORTHERN FOREST

348. A vast solitude.—To the north of all the regions we have studied is the vast land of the gloomy evergreen forest; of the lonely fur-hunter, and the trading post on the green-clad river bank. There man must travel by canoe on the streams, or by dog team through the dark and often pathless forest. It is so lonely there that people sometimes wish so much to hear the human voice, that they begin to talk to themselves. Sometimes they can not stop talking, and so go crazy—"bush crazy," as it is called.

This country lies beyond the land of farms. (Fig. 14.) For that reason the white man has let it remain the home of the Indian, and goes there himself only to hunt, to trade, or to seek minerals. What regions form its southern bounds? Its northern boundary is the northern limit of trees. It reaches from near the Atlantic to the Rocky Mountains and almost to the Pacific Ocean, but it does not quite touch either coast, because trees cannot grow near the cold waters of Bering Sea, or close to where the Labrador current, ice cold and dotted with floating ice, flows

down from the Arctic. A short distance inland from the cold ocean waters trees grow, and for this reason the interior of Newfoundland is forest country, where there are a few very large papermills. These papermills have been built by the owners of London newspapers, which are printed on Newfoundland pulpwood paper.

349. Lumbering.—Most of our timber has been taken from land we were clearing for farms, but this Northern Forest Region will not be made into farms. It is the great wood reserve of North America. As yet, the white man can use it only at a few places on its edge. One such place is along the St. Lawrence tributaries, where Canadian lumbermen camp all winter, chopping and hauling logs to the stream banks; ready to float down in the spring log drive. These logs supply many papermills and sawmills, and make Ottawa a great lumber city. Some of the lumber from the Northern Forests is used on the edge of the Wheat Region, and a little has been used by the miners on the Yukon in Alaska and in British territory;

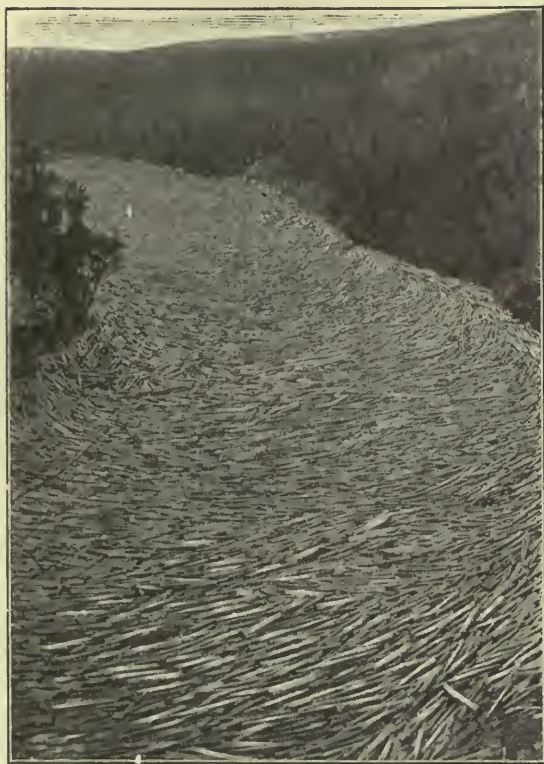


Photo. International Film Service, N. Y.

Fig. 287. A log jam fills this northern river with logs. In what ways does the river help the lumber and paper industries?

but throughout most of its vast extent the forest has been of value to man mainly through the fur and game that it produces. What rivers drain this region? Would it be better for trade if they all flowed south?

350. Mining—In some places rich minerals are being found. The land is probably rich in minerals, but most of it is still unexplored. There are rich silver mines at Cobalt, in eastern Ontario, and since 1897 gold has been mined near Dawson, on the Yukon. At that time there was a great rush of miners to the gold region of the Yukon. In 1921 there was great excitement because petroleum had been discovered near Great Slave Lake, and on the Mackenzie River at latitude 60°. Steamboats run in the Mackenzie River and carry supplies down stream from the Canadian railroads. The Canadian Yukon settlements are so dependent upon the Yukon steamers that they can not get even a bottle of medicine by any other route.

351. A timber reserve. Can we save it?—The great future use of this region is to produce wood. Civilized man needs ever-increasing amounts of wood, and the world's forests are steadily growing smaller and smaller. The time is soon coming when much of North America will have to depend upon this great northern forest. Already millions and millions of fine logs have been burned there by terrible forest fires. It is to be hoped that the governments of Canada and the United States (which controls Alaska) will be able to keep the fires out of this wonderful forest and will preserve it until the time comes when we need to use it. The time is not far away when sawmills and pulp-mills along the Yukon, the Mackenzie, the Saskatchewan, and the Nelson rivers, as well as those already at work on the branches of the St. Lawrence, should be making the boards needed for houses, and the rolls of paper which will finally be made into the newspapers and books which we use. This can not happen, however, unless the forests are protected. Many trees must be protected from fire for a hundred years before they are big enough to be made into good boards.

352. A water-power reserve.—The eastern part of this district, in Ontario and Quebec, has thousands of glacial lakes on a plateau. These lakes store water, and provide an even flow in the streams that tumble down toward the St. Lawrence. This is one of the great water-power regions of the world. In time to come much of this power can, if needed, be taken by wire even to the coast of New England. Compare the distances with the power lines in Fig. 194. Thus this northern land of few people may send wood and paper to the entire continent, and it may also help the whole United States by furnishing power to turn the wheels in the mills of New England and other states. This forest belongs to Canada, but we in the United States will be its chief users.

353. Hunting as an industry.—Already thousands of Americans go into Canadian woods each year to hunt and fish. Indians earn money by serving as guides for the

visiting white men. Throughout most of its length the Great Northern Forest still is and will continue to be the permanent home of the fur-hunting Indian.

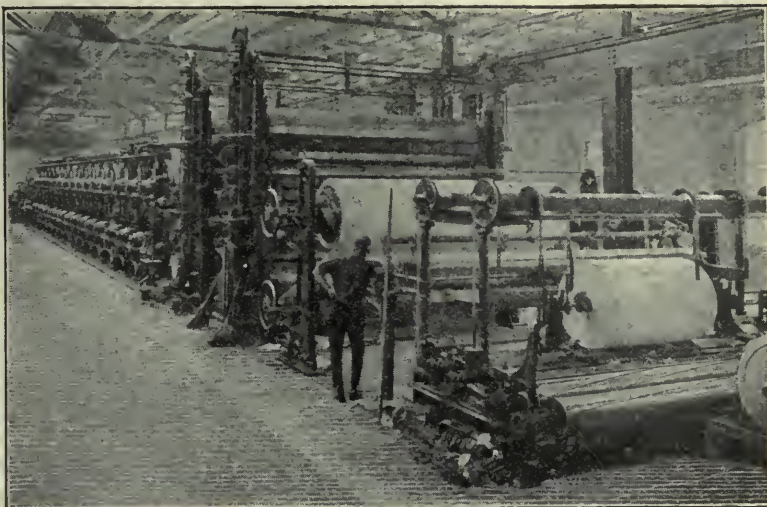
354. Possible farmland for the future.—Most of the Great Northern Forest stands on ground made rough and stony by the great glaciers, but the Mackenzie Valley and parts near the Rockies have soil that can be plowed. Big crops of potatoes have been grown at Fort Vermilion near Lake Athabaska, and even on the Yukon near the Klondike. As we come to need more land, and secure new crop plants that will grow in a land having cool, short summers, some parts of the forest may be cleared for farms. In northern Ontario is a district of clay soil and few stones where some farmers are settling. Near the base of the Rockies some of the plain may be cleared and added to the Wheat Belt; but this will not be done until the land farther south is used much more fully than it now is. Most of this region is good for nothing but forest.

QUESTIONS

1. What is the chief source of wealth in this region? Name two other products of great value. 2. Sketch on an outline map of Canada the forest area. Indicate the important rivers and lakes, the chief towns, and the district's productions suggested by Question 1. Show where agriculture may in time replace some of the forest. 3. Find two other parts of the world similarly located, from which the future timber supply may come.

4. What difficulties face the gold-miner along the Yukon (Fig. 286) which are not present in the mountains of California? 5. Make a list of the town names in the Great Northern Forest beginning with *Fort*. What do such names indicate about life in this region? How long would you want to stay in this region?

6. Define "timber line". Is it at the same elevation in the Northern Forests as in Colorado? Explain the difference. 7. England is a land of rich farms and many cities. Why is this not the case with the Northern Forest Region in the same latitude?



Courtesy S. D. Warren Co.

Fig. 288. At the far end of this vast machine a thin layer of water, filled with floating shreds of wood fiber, flows over a screen and leaves the fiber on it. This soft wet sheet is then passed between rollers hot with steam which press it, dry it, and finally pass it to the last roll as an endless sheet of clean white paper.

ARCTIC PASTURES, POLAR SEAS, AND POLAR ICE CAPS

355. The Arctic tundra.—The land north of the Great Northern Forests is a treeless plain called the tundra. (Fig. 14.) It has less snow-fall each year than has New York or Michigan. The air is so cold that it does not hold enough moisture to make deep snow. In a few weeks the summer sun melts the snow from all the land of Arctic America, except the ice of Greenland and a few mountain tops. This happens because for weeks and even months the sun shines at midnight as well as at mid-day beyond the Arctic Circle. This continuous heat melts the snow and warms the land so that moss, flowers, and grass grow rapidly, and the land is soon bright with flowers. Even blue-grass, like that in Kentucky (Sec. 83), grows at Etah, Greenland, a thousand miles beyond the Arctic Circle. Two or three feet below its flower-decked surface the tundra earth is still frozen. This underground ice, melting a little, keeps the top moist, so there is never any drought. This condition is true of all those parts of America north of the limit of trees and not covered by the ice cap. Name some of these lands. (Figs. 14, 94.) What governments rule them?

Fig. 289.



Photo. Publishers' Photo Service, N. Y.

Fig. 291. The monarch of the Arctic ice. A snapshot of a living polar bear on his throne of floating ice. What other animals make their home in this cold land?

356. The animals and waterfowl.—In summer the tundra buzzes with the sound of millions of mosquitoes, and is noisy with the cries and calls of ducks, geese, swans, loons, and other waterfowl that go there to eat mosquitoes and grass, and to rear their young. In winter when the ground is frozen hard and covered with snow the waterfowl have migrated to the southland, some going as far as Argentina. The tundra is the permanent home of the caribou, or wild reindeer. In summer he finds pasture and in winter he gets food by digging away the snow to eat the grass and moss that lie beneath it. His enemy is the wolf pack. The wolves in this region live almost entirely on reindeer.

357. The Eskimo and his future.—The Eskimo hunts along the seashore and on the tundra, living in his tent in summer and in his snow house in winter; but a new era is dawning for the Eskimo. He is becoming a reindeer farmer.

White men have always thought that the tundra was useless, but the explorer Stefansson and other men are now sure that it is to become a land of reindeer ranches, which will furnish much venison (reindeer meat) to the people who live far away to the southward. The reindeer industry is already succeeding on the Alaska tundra. This is lucky for the Alaska Eskimos, who were about to starve

because the white men were killing so much of the game on which they had lived.

Mr. Sheldon Jackson, an American superintendent of schools for the natives of Alaska, persuaded the United States Government to buy some tame reindeer from Lapland and Siberia, and to hire Siberian reindeer herders to come with the animals to teach the Alaskan natives how to take care of reindeer. The Alaskans have learned. The flocks have increased. In 1892 there were 1200 reindeer. In 1921 there were over 200,000, even after the natives had eaten 100,000. The Eskimos would rather follow flocks of reindeer than hunt wild animals for a living. They are proud of their new flocks, which furnish them with food and clothes and something to sell, and which also serve them as beasts of burden.

The American superintendent of schools in Alaska travels each year with reindeer teams more than a thousand miles, inspecting schools. He says reindeer are better than dogs as sledge animals. (Fig. 286.) The Canadian Government has recently given large grants of land to companies that will raise reindeer, and in a short time there may be millions of those very useful animals.

358. A land of ice.—People used to think that all of northern North America was covered the whole year with snow and ice. This is true only of a part of Greenland. All of Greenland except the southwestern and



Photo. Wm. Thompson

Fig. 292. Eskimos near the mouth of the Mackenzie River.

southeastern coasts is covered with solid ice, hundreds and thousands of feet thick, and having new-fallen snow on top of it. This ice mass is supposed to be just like the continental glacier that once covered so much land. (Fig. 53.) It creeps slowly along down to the sea, and there huge chunks break off and float away as icebergs. (Secs. 159, 251.) Sometimes they wreck ships that happen to be sailing past Newfoundland. Ice-



© Underwood & Underwood, N. Y.

Fig. 293. Icebergs on the Grand Banks in the United States-United Kingdom steamer route. A United States revenue cutter is reporting icebergs by wireless to distant steamers. About one-eighth of an iceberg is above water. You can scarcely see men standing on the deck of the ship. What do you conclude about the size of icebergs?

bergs floating south meet the warm Gulf Stream, which melts them. The windstorms that rip across the Greenland ice are so terrible that only one or two parties have ever made the hard journey across the ice cap.

359. Animal life in a sea of floating ice.—

The Arctic Sea north of Alaska and between the islands that lie west of Greenland is so full of blocks of floating ice that only one ship, the 46-ton *Gjoa*, has ever been through it, and it took Captain Amundsen three years, 1903–1906, to make the passage. (Fig. 289.) But there is life even in this polar sea, and on its ice floes, some of which may be as small as a table, some as large as a city block, and some even a mile or two long.

Many fish and other water animals live in these cold waters. The shrimp is the chief food of seals that live under the ice and come up from time to time to breathe at holes, or to crawl out and rest. Often, while the seal sleeps on the ice cake, the polar bear steals up to catch him. Thus the bear gets his living.

Each polar bear, as he prowls about the shore or on cakes of floating ice, is followed by Arctic foxes, sometimes by as many as six. When the bear catches a seal and begins to eat it, his fox followers sit at a safe distance, barking at him. When the bear

finishes his feast and goes away, the foxes then come and eat the leavings. Afterward they hunt up the bear and wait for him to catch another seal.

An American explorer, Stefansson, has learned how to live on ice floes, and how to get a living much as the animals do. He can catch seals better than the bear can. With one team of dogs, a tent, a rifle and cartridges, he can travel about on the ice cakes and shoot enough seals to feed himself and his dogs. He has traveled for hundreds of miles over the Arctic Ocean, camping on floating ice and stepping from one block to another, studying the things he found there.

360. The Antarctic continent.—While the knowledge of the Arctic regions is still fresh in our minds, it will be well to study about Antarctica (Fig. 290), the cold land about the south pole.

What is the latitude of the part of the Antarctic land nearest the equator? (Fig. 290.) Find a place in North America having the same latitude. Point out places on the coast of North America as far from the equator as is the tip of South America, of Africa, and of New Zealand.

The Antarctic Region differs from the

Arctic in having a continent at the pole and wide seas all around.

The Antarctic continent is larger than the United States, but no one lives there. Ice caps cover all of it except a few rocky shores. On all sides the ice creeps down from the land and works out into the sea. Ships have sailed for days in front of solid cliffs of ice that are much higher than the highest mast of a ship. Enormous pieces of the ice sheet, some of them as big as a city or a town-ship, break off and float away before the west winds, leaving a high wall of ice rising from the cold sea.

Brave men anxious to find the South Pole have risked their lives and died in the terrible journey over this Antarctic ice. The North Pole was found to be on an ice-covered sea, but the South Pole is on an icy plateau nearly twice as high as Mt. Washington.

The southernmost homes of men are on Tierra del Fuego and the Falkland Islands. (Sec. 837.) Between this land and the Antarctic ice wall there are a few small, cold, damp islands, inhabited by seals, wal-ruses, and penguins. Penguins are queer-looking birds that cannot fly, but like the seals swim in the sea, and get their living by catching fish and small animals.

QUESTIONS

- 1. Name the territories and islands which are included within these regions.
- 2. Make a list of the animals which Mr. Stefansson probably saw during his journey across the polar seas and lands. Tell about a new animal industry.
- 3. How far is Nome from the equator? Compare its climate with that of Sitka. Offer two good reasons for the difference.
- 4. How are icebergs formed? Why are so many found in the North Atlantic?
- 5. Name a great vessel wrecked some years ago by collision with an iceberg off Newfoundland Banks. What precautions (Fig. 293) does our government take to prevent such disasters?
- 6. How does the Eskimo provide himself with food and clothes before he becomes a reindeer farmer? When he has reindeer meat and hides to sell, what changes will take place in the way he lives.
- 7. Make use of the following outline to compare the manner in which the Eskimo and the Indian of the Great North Woods supply their needs.

FOOD.	CLOTHING.	SHELTER.	FUEL.	TRANSPOR-TATION.	LUXURIES.
Indian Eskimo					

- 8. Mr. V. Stefansson, Admiral R. Peary, Mr. R. Amundsen, and Mr. D. Macmillan have each written splendid accounts of their explorations of the Polar Seas. Some, perhaps all, of these you may secure from a library.
- 9. Find from some good encyclopedia a few facts about the aurora borealis. How does it make life more pleasant for the people of the northlands?



Fig. 294. A large herd of Siberian reindeer on the Arctic tundra. (Sec. 357.)

© Lomen Bros., Nome, Alaska



Photo. Publishers' Photo Service, N. Y.

Fig. 295. The Prado, in Havana. Every Sunday afternoon all who can afford it drive round and round these rows of trees. They are out to see and to be seen, dressed in their very best.

THE SOUTH LANDS AND THE TRADE OF NORTH AMERICA

THE LOW PLAINS AND UPLANDS OF MEXICO AND CENTRAL AMERICA

361. Lands without winter.—Let us now travel from the lands of ice and snow to the lands where these things are unknown. In imagination we can do this in an instant, but it takes many days to make the actual journey. Can you tell how we might travel from the land of reindeer to the land of bananas on the shores of the Caribbean? What changes need we make in our clothing?

In the lands south of the Gulf of Mexico there is no winter, as we know winter, and no frost, except on high mountains. There the weather is much less changeable than our own. People can often tell for several weeks ahead what the weather will be, because the winds are not like the irregular cyclones that cross our country. Their winds blow almost always from one direction only, and for that reason are called constant winds.

362. Winds.—The lands between the tropics of Cancer and Capricorn (Fig. 10)

have three wind regions: (1) the north-east trade, (2) the doldrums, and (3) the southeast trade. We shall study about all of these winds later. Now we are interested in only the northeast trades, because they make the climate of this region.

363. The northeast trade winds.—In southern Mexico and Central America the wind blows from the northeast nearly all the time, and is called the northeast trade wind. For thousands of miles this northeast wind sweeps across the Atlantic, the Pacific, and the Indian oceans in this latitude.

364. Trade-wind rains and forests.—When winds from the ocean blow against mountains, they cause rain. (Sec. 158.) Which side of Central America, of Mexico, and of the big islands in the trade-wind belts will have the most rain? (Figs. 144, 641.) What can you tell about the plants that grow on the northeast or windward side



Fig. 296. Salamanca Indians shooting fish in eastern Costa Rica.
The chief wears a headgear of white feathers.

© H. Wimmer

of Jamaica? of Hawaii? on the southwest or leeward side? The climate on a coast against which the trade wind blows has rainfall at all seasons. (Fig. 303.) Frequent rain and steady heat make thick, tangled forests along the eastern side of Central America and Mexico. On the Pacific side there is less rainfall than on the Atlantic side, and the forests there are not so dense.

365. The people of Central America and Mexico.—Before the English and French settled the frosty lands of the United States and Canada, people from Spain had made settlements on the hot shores of Mexico and Central America. This land is so hot that the white man does not thrive there as he does farther north, so white people do not outnumber the Indians as they do in the parts of North America having frosty winters and warm summers. In some of the Central American countries there are only a few hundred or a few thousand people of pure white race. A somewhat larger number are part Indian and part white, but most of the people are the native, dark-skinned Indians.

366. Many countries.—If the people of Central America wish to go from one country to the next, the journey over land is up and down, up and down, from valley to ridge, from ridge to valley. Roads are few, travel is difficult. This difficulty of travel separates

the people more than they would be separated if they lived on different islands in the sea. Several times they have tried to form a union. In 1920, Guatemala, Honduras, and Salvador united to form one government. It is called the Central American Federation and its capital is Tegucigalpa. The governments of the Central American countries are much like that of Mexico (Sec. 149), and peonage is common.

367. The three regions.

—The people of Central

America and Mexico speak of their land as having three parts: (1) the cool land of the high plateau; (2) the hot land of the low plains, and (3) the temperate land which is on the slope between the other two.

We need not study the cold or cool land now, as we have already become acquainted with it (Sec. 143), and we know that much of Mexico is high enough to be a cool plateau. It is there that most of the Mexican people live and enjoy a pleasant climate with warm days and cool nights.

368. The warm or temperate lands.—Name the countries between the southern end of the southwestern plateaus and the Isthmus of Panama. (Fig. 299.) The mountains of this region are as high as the highest Appalachians. The so-called temperate region is on the eastern and western slopes of these mountains and on the similar slopes coming down from the Central Plateau of Mexico.

Much of this temperate land is high enough to be cool, but not cold enough for frost. Indeed it has the delightful temperature of a pleasant spring day. Yet it has enough heat to produce fine crops and enough rainfall to support forests. It is in this temperate region that most of the people of Central America live. Nearly all of it is made up of small uplands, the slopes of hillsides, and narrow valleys through which

streams rush down toward the lowlands. There are no wide, level plains like the Corn Belt, the Wheat Belt, or the Plateau of Mexico.

369. Village life. — The people continue to live much as they did before Columbus came to America. The grass huts and stone houses are grouped in little villages which are surrounded by banana and orange trees, and by other trees whose fruit we may not have tasted.

Space for little gardens is secured by chopping down the weeds with a long knife, the *machete*. (Fig. 300.) The planting is sometimes done with the aid of a sharp stick, and the crops are cultivated with hand tools and without the aid of animals or plow. This simple culture is applied to gardens and to little patches of corn, yams, and cassava. These three vegetables have the same place in the native diet that bread and potatoes have in our own. The cassava is an edible root somewhat like the sweet potato or yam. (Fig. 551.) For eating, the root is first boiled, then dried and grated into meal. The meal is mixed with water, and baked in little thin cakes which serve as bread. Milk, eggs, and meat are furnished by the cows, goats, chickens, and pigs which roam about.

Above the villages perched on the hillsides are the sharp mountain tops; below are the hot, forested lowlands where swamps breed mosquitoes.

370. Trade. — Coffee and hides are the chief exports of the upland people. These articles are easy to carry on the back of a mule down a rough trail to the port, or to the railroad station from which they are shipped. Equally easy to carry is chicle, a gum gathered from trees in the forest, and from which chewing gum is made. These people of the green hillsides pay with chicle, coffee, and hides for the hardware, clothes, and



Courtesy United Fruit Co.

Fig. 297. Central American villagers and their village in the "Temperate Land." Where is the cost of living greater, in your home or in this village?

other manufactures that we send them on the steamers going to the Caribbean ports.

371. The hot lands. — The low land along the shores of the Gulf of Mexico, the Caribbean, and the Pacific is a hot land. It is a flat country, and heavy rains make many swamps, especially in the eastern part, where the rains are heavier and the low plain is wider.

Every day in the year mosquitoes buzz; there is no frost there to lay them low even for a season. For a long time the Mexicans called Vera Cruz "The City of the Dead," because it was so unhealthful. Trees grow rank and green on this jungle plain. Creepers and vines climb the trees and tangle the branches into jungle masses, through which a man can pass only after cutting a path with the *machete*, a piece of property more common than shoes in this tropic forest land. For centuries these coast forests have been little more than a barrier which kept people from the interior slopes and plateaus. Until recently only a few logs of mahogany and cedar had been exported, but now some rubber has been sent out, and banana plantations (Sec. 375) have been started. But from the Lower Rio Grande district to Panama, as well as on the Pacific side, the coast plain still remains an almost unbroken forest, with fringes of beautiful coconut



© E. M. Newman

Fig. 298. The National Theater at San Jose, Costa Rica, a city as far above the sea as Denver is.

trees waving their long leaves along the shore. (Figs. 302, 535.)

372. Hot land cities.—Name four coast cities in this region. (Fig. 299.) They are all small cities, for people do not live on the coast unless held by business. (Sec. 371.) Steamers call at a few small Pacific ports on their way from Panama to San Francisco; but most of the trade of the region is from the east coast for two reasons: (1) The eastern plain, with bananas, sisal, and petroleum, produces much more than the western plain does; (2) nearly all of the trade is with countries across the Atlantic.

The capitals of all the Central American countries except Panama are pretty cities of white-walled houses, nestled on the uplands of the interior.

Colon and Panama, at the ends of the Panama Canal, are chiefly supported by business arising from the passage of many ships through that great waterway. Both cities are in the Canal Zone, a strip of land which was ceded by the Republic of Panama to the United States before the canal was built. The Canal Zone is ruled by a governor sent out by the United States.

373. The Yucatan sisal district.—The wide flat plain of northern Yucatan differs from

the rest of this coast because it has less rain. Still worse, the little rain that falls runs away into caves and underground passages that are present because the rock is limestone. (Sec. 22). Consequently this region has no real forest. Much of it is covered with the scraggy growth of the century plant, whose long leaves have a fiber good for making cordage. Millions of dollars worth of this fiber, called sisal, is shipped each year from the port of Progreso. American farmers use it to bind up the

sheaves of wheat at harvest time.

Southeastern Yucatan is quite a different place. Here the rainfall is greater, and the solid forest is so thick that for many miles the land is absolutely uninhabited, even by wild Indians.

374. Mexican oil.—One of the great oil fields of the world is in the northern part of the Mexican lowlands, near the port of Tampico. Sometimes when wells are dug, the oil spurts out in a solid stream. Single wells have produced millions of barrels. Each year hundreds of tank-ships loaded with tens of thousands of gallons of valuable crude petroleum sail out of the port of Tampico for American and European ports. English and American companies run this industry. The engineers and the skilled men are usually Americans, but most of the work is done by the Indians and half-breeds of Mexico.

375. Americans and the banana.—The forest of the hot lands, where forages only the Indian has lived, is at last being conquered by an organized industry. (Fig. 301.) New villages are springing up on the hot coasts of Central America. Thousands of men live there and work for American banana companies. These men attack the forest almost

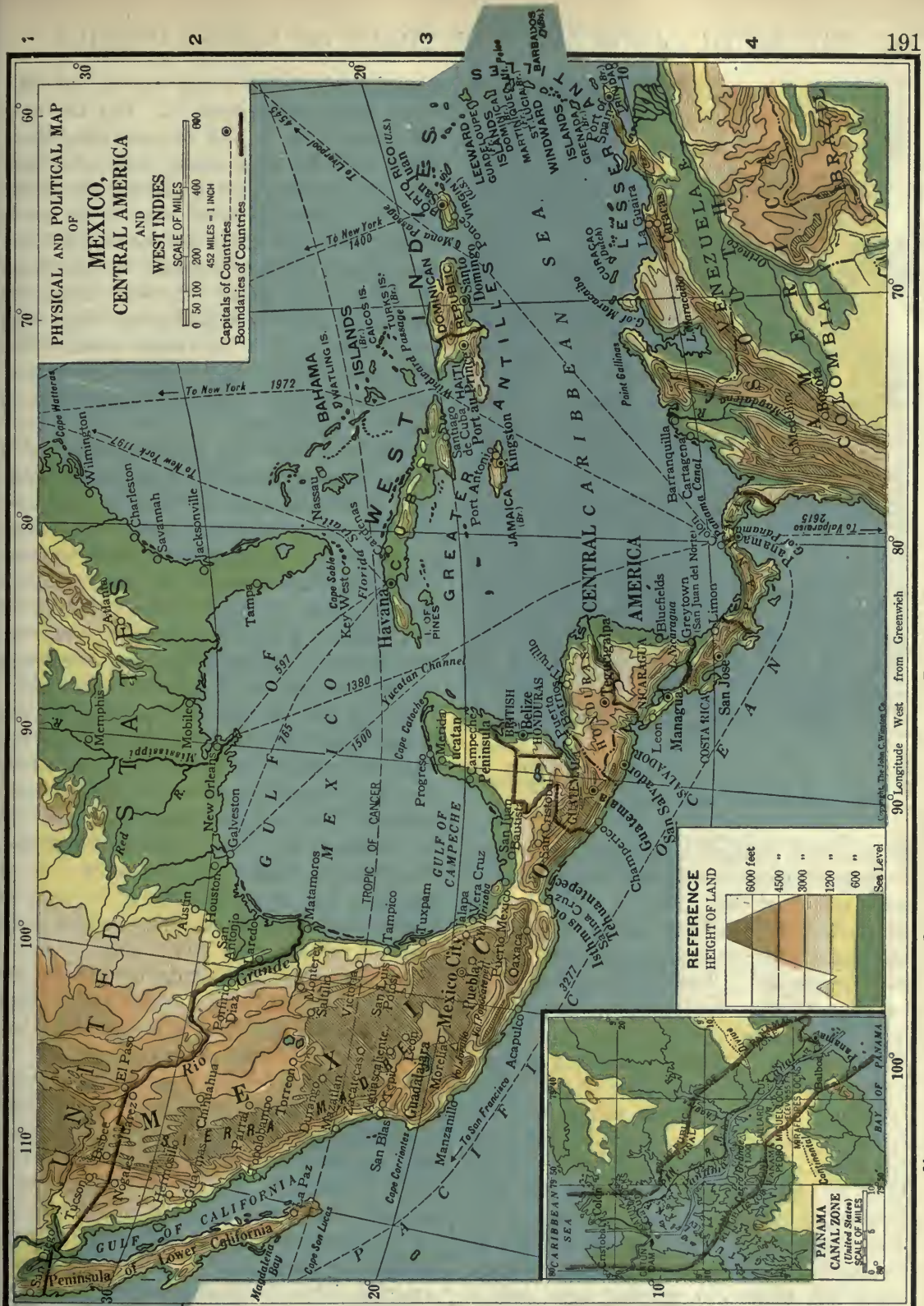


Fig. 299.



Photo Wm. Thompson

Fig. 300. Jamaica negro laborers harvesting the first crop of bananas on a Guatemala plantation that belongs to a New England corporation.

as an army besieges a fortress. A banana company begins work by building a wharf on some protected bay. Next, a village is built to shelter the workers, and a hospital is established where a physician and nurses care for the sick. Then a ship brings white superintendents, bookkeepers, machinists, and other skilled persons from the United States. Other ships bring hundreds of black men from Jamaica or other West Indian islands. The newcomers move into the houses, and the black men begin to chop down the forest. The trees are allowed to lie as they fall, for in a few months all will have been eaten by the white ants. These terrible insects sometimes enter houses and eat up the furniture. If you lived in tropic America, some day when you touched your desk it might fall to pieces, the inside entirely eaten out by the ants. If you picked up a book,

you might find that it was only a shell—the white ants having eaten it. But the ants are useful help in the banana plantation, where they eat up a whole forest after men have cut it down. Little banana plants are stuck in among the fallen trees on the newly cleared land, and every few weeks the black men come with their *machetes* to chop down the bushes that would otherwise choke the plants and keep the sunshine and plant food away from them. In twelve months the trees have become much higher than a man, and have bunches of green bananas hanging ready for the harvest.

Then one day the superintendent of a banana plantation receives a wireless message from a ship at sea. It tells him to have bananas ready in three days. Everybody goes to work. A single blow of the *machete* (Fig. 300) cuts a bunch of green bananas from the tree. A mule carries two bunches at a time to a little narrow-gauge railroad that connects the plantation with the larger railroad leading to the wharf and the ship.

All day and all night the bunches of green bananas are carried into the ship and packed into her great hold, where they are cooled to just the right temperature required to keep bananas. In four, five, or six days they will be unloaded at New Orleans, Baltimore, Philadelphia, New York, or Boston. Moving belts will carry them from the ship to freight cars which are waiting to whisk them away at full speed to inland cities, even to those far away in Canada or the Pacific Coast. (Fig. 301.) In summer the banana car is cooled. In winter it is heated so that the bananas will keep perfectly.

When the ship returns to get more bananas, it carries barrels of meat from the Chicago packing houses, sacks of flour from Minneapolis, clothes from New York, and *machetes* from Connecticut. Thus do the hot-land dwellers send away bananas and receive in return goods and utensils. The Connecticut *machete* is very highly prized in tropic America. It is the most important tool that the people have.

From the tall palm trees that grow near

the seashore, many coconuts are sent to this country.

376. Future.—The future of the low plains may be very different from the past, because man is learning to conquer diseases. Yellow fever, malaria, and other diseases have in the past killed so many people that the lowlands of these countries are still almost empty and the uplands are not fully used. When work was first started on the Panama Canal, about 1880, men died like flies from yellow fever. Then no one knew how the disease spread. But when, about 1900, work was again begun on the canal, scientific men had found out that a few of the several varieties of mosquitoes carry all the yellow fever germs and all the malaria germs that man ever gets. By protecting the men from being bitten, and by killing the mosquitoes, the canal workers were kept almost as free from disease as men are in their homes in America. There is no doubt that we want the bananas, coconuts, and other products of that land, and the people there want the products of our land. As living in the tropics has been made safer for the white man by discovering how to combat diseases, we may expect the tropic population to grow, and production, trade, and prosperity to increase.

QUESTIONS

1. Group the products of this region as follows:

THE HOT LANDS. PRODUCTS OF			THE TEMPERATE LANDS. PRODUCTS OF FARMS.
MINES.	FARMS.	FORESTS.	

2. How does the climate of northern Yucatan differ from that of most of the East Coast Lowlands? Give two reasons for the difference. Name the chief product of the peninsula. How does the Yucatan farmer help the Wheat Belt farmers to produce their crops? 3. What part of our country is benefited when a shipload of freight goes from San Francisco to New York through the Panama Canal?

4. Which is the more pleasant place in which to live, Port Limon (Fig. 299) or San Jose? Why? 5. How many countries do you find in all North America? in Central America? How is the surface of the country largely responsible for the many small Central



Fig. 301. A banana trade map. Through what port do your bananas come?

American States? 6. What lessons may be learned from the many successful banana plantations of Central America about the agricultural possibilities of the tropics?

7. Gather the following data about Central America:

- (a) Number of rainy months (Fig. 303).
- (b) Number of warm months (Figs. 328, 329).
- (c) Average yearly rainfall (Fig. 144) inches.

From this data explain the following:

- (a) Dense tropical lowland jungles.
 - (b) Indolent character of the people.
8. Mexico is sometimes referred to as a "storehouse of the world." What facts can you recall about this country to justify such a title? (Sec. 150.)

THE WEST INDIES

377. The name.—When Columbus discovered one of the Bahama Islands, in 1492, he thought he had reached the East Indies, so he called the people Indians. The name Indian still clings to them. All the islands near are called the West Indies.

378. Formation.—The West Indies are really the tops of a high and rugged chain of mountains that rises up three miles from the bottom of the sea before the tops can appear as islands. In some places the sea near them is more than three miles deep. The four big islands are called the Greater Antilles. Where are the Lesser Antilles? (Fig. 299.)

379. Climate.—The trade wind blows over



Fig. 302. A workman's house on a sugar plantation in Cuba. Is the trade wind blowing?

all the West Indies. To which part of these islands does it bring the most rain? (Figs. 144, 641 and Sec. 364.) Which side is therefore green with thick forests, and on which side would you expect to find scattered trees and thinner forests, such as grow in dry places? The weather is always warm in the West Indies. A grass house is all that the people really need to keep off the rain and sunshine (Fig. 302), but stone houses are quite common.

Sometimes terrible storms, called hurricanes, visit the islands. These storms are much like the cyclones that cross the United States, except that the wind blows harder; so hard that sometimes it beats down the banana trees and does much other damage.

380. Settlement and people.—The Europeans who first explored America wanted sugar and molasses. These are made from sugar cane, which did not grow in Europe. Also they wanted rum that is made from molasses. For this reason, long before the United States was settled, the West Indies were settled by colonists from most of the countries of Europe. Even now there are French, Dutch, and English colonies there, as well as many Spanish people, and sugar cane is still the chief crop.

The early planters not only made slaves of the Indians, but brought negro slaves from

Africa to work their sugar plantations. The Indians either died or ran away, but the negroes stayed and thrived. Now nearly all the people on many of the islands are black. Only in Cuba and Porto Rico is the population chiefly white. In Trinidad and Jamaica, two of the British islands, there are many thousands of dark-skinned people who were recently brought there from India to work by contract in the sugar plantations. When their work contracts were finished, instead of going home

to India, they remained in the West Indies.

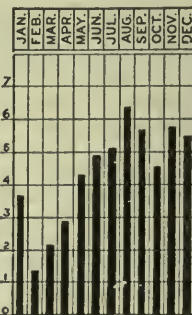
381. Government.—There are many kinds of government in the West Indian islands. Most of the European colonies have governors from Europe, and councils, each composed of a few resident men, who help rule an island or a group of islands.

Cuba was once a Spanish colony, but is now a republic. The United States has a treaty with Cuba which provides that, in case of civil war in Cuba, we will send a governor to rule until peace comes again. Not long ago there was civil war, and we sent a governor there who ruled for three years.

The governor of Porto Rico is sent from Washington. The members of Congress are chosen by the people, but their Congress cannot pass laws of which our Congress at Washington disapproves.

Haiti is about the size of West Virginia and has twice as many people, almost all of whom are the descendants of negro slaves. There are two countries

Fig. 303. Rainfall of San Juan, Porto Rico, 64.3 inches per year. This rainfall is a trade wind shore type. Will this rain make sugar cane and forests grow?



on this island: Haiti, whose people speak the French language, because that part of the island once was a French colony; and the Dominican Republic, where, for a similar reason, Spanish is spoken. The government of these countries is run partly by the natives and partly by the United States. These countries are almost colonies of the United States.

382. Agriculture.—Sugar cane, coconuts, bananas, oranges, and other tropic fruits thrive in the trade-wind islands. Many things grow in these warm lands that can not be produced successfully in most parts of the United States, because frost injures or kills them. Especially does sugar cane thrive, and sugar is the chief export from the West Indies. In Louisiana, where there is frost, sugar cane must be planted every year or two; but in the West Indies and some other tropic countries, the roots live from seven to twelve years, and send up a crop of the sweet canes each season. Cuba, which is about the size of Louisiana, but which has more people, is the greatest sugar island in the world. When you reach for the sugar bowl or a glass of soda-water, you can think of Cuba and Porto Rico.



Fig. 304. Average production of cane sugar in five leading countries (1915-1918)

	Tons
A. Cuba.....	3,720,000
B. Java.....	1,790,000
C. Hawaii.....	610,000
D. Porto Rico.....	480,000
E. Philippines.....	410,000
F. United States.....	270,000



Photo. Publishers' Photo Service, N. Y.

Fig. 305. Negro women going to market in Jamaica. The donkey has a load of tropic candy—sugar cane. What signs of white man's rule does this picture show?

383. Sugar plantations.—The mill on the sugar plantation is a big building having tall smoke-stacks and much machinery. So much cane is needed to keep a mill busy throughout the season that cane fields may stretch as far as

one can see. (Fig. 623.) At harvest-time the cane is hauled to the factory on little temporary railroads or on carts drawn by oxen. These oxen are fed on the leaves that fall from the cane. The sugar-fields cover only about one-twentieth of the surface of Cuba, but the yield of this small area is so great that it needs a year to take all of the sugar to market, even with two ships carrying away a load of five thousand tons each on every work day. Cuba also sends us pineapples and tobacco.

384. Porto Rico.—Porto Rico is the largest of the American possessions in the West Indies. It is a densely populated island, about twice the size of Delaware, but it has six times as many people. Most of the land of Porto Rico is hilly or mountainous. For this reason it is well drained and, therefore, much more healthful than many tropic countries. The greater part of the people are white, and of the Spanish race, because this island was for a long time a Spanish possession.

Most of the people make their living on small farms, where they grow bananas, sweet potatoes, and many garden vegetables for their own use.



© Brown & Dawson

Fig. 306. Women working in a sugar cane field in Barbados. The windmill is of Dutch type with sails on its wings. Who rules this island?

The trade is largely with the United States, the chief export being sugar, which is grown on the level land near the sea. Next in importance is tobacco; then come coconuts and fruit. Some delicious coffee is grown on the highlands. There is an agricultural experiment station in Porto Rico. We can see the importance of this station, and of good steamship lines, from the fact that the trade in grapefruit grew from \$7,000 in 1907, to \$700,000 in 1919.

The Porto Rico women make by hand beautiful embroidery, which they sell to people of other countries.

385. Jamaica and Haiti.—Jamaica and Haiti export excellent coffee from their hills, and Jamaica also exports many bananas from her lowlands. The black men of Haiti cut mahogany from their forests to be made into furniture.

386. The Bahamas.—To the north of the four mountainous Greater Antilles are the low, flat Bahama Islands, which lie close to southern Florida. These limestone islands, which, combined, are about the size of Connecticut, were made by coral animals that live in the warm sea. Such islands have a shallow, dry soil (Sec. 21), not so good for agriculture as the deeper, moister lands of the more mountainous islands. The chief export of the Bahamas is sisal, like that which

grows on the dry limestone soils of Yucatan. The people of the Bahamas, like the people of Key West, Florida (Sec. 23), gather sponges in the shallow water near their islands.

387. Trinidad.—The British Island of Trinidad sends us cacao beans, from which chocolate is made, and of which we shall learn more in another part of the book. (Figs. 575, 576.) From a wonderful lake of asphalt on this island come shiploads of this black substance to pave our city streets. In the lake, asphalt flows slowly like a huge lump of dough, but it is so thick and so tough that it has to be dug out of the lake with a shovel. The morning after the holes have been dug, they are again full of asphalt.

388. Cities and trade.—Trading is much easier for the people of the West Indies than for the people of Mexico or Central America. There are few swamps, and ships can come close to the well-drained plains where the people live and have their plantations. The largest West Indian city, Havana, is the capital of the largest island. Other important cities are San Juan, Kingston, and Port au Prince. Locate them. At these ports many steamships from the United States and Europe call to leave and take on freight.

389. Coaling stations.—The town of Charlotte Amalie on St. Thomas, one of the Virgin Islands, which the United States bought from Denmark in 1917, is visited by many steamers that stop for coal en route to or from the Panama Canal. The island of Barbados is also an important coaling station for vessels on the trip between New York and South America. Port of Spain, in Trinidad, has an important trade, because steamers leave goods there to be sent on to the little towns along the coast of Venezuela.

390. Food and trade.—The West Indian shops are filled with clothes from Europe; tools and hardware, corn meal, wheat flour, and salt pork from the United States; and dried codfish from Newfoundland.

Salt pork and dried fish are important foods in such places, because they will keep in hot, moist weather when fresh meat would spoil over night. If the people do not choose

to buy American food, they can live comfortably on bananas, sweet potatoes, cassava, beans, and other vegetables and fruits grown in their own gardens.

391. A winter vacation land.—From our Atlantic and Gulf ports the journey to these beautiful islands is not a long one. After four or five days at sea, the steamer comes in sight of the beautiful green hills, waving palms, and friendly, laughing people of the West Indies. It makes a pleasant winter vacation to leave the December snows of New York or St. Louis and go to this land that knows no frost.

QUESTIONS

1. Have you recently eaten anything which probably came from the West Indies? 2. Gather together into the following outline the facts you have learned about these islands:

GREATER ANTILLES.				LESSER ANTILLES.		
NAME.	COLONY OF.	CHIEF TOWN.	IMPORTANT PRODUCTS.	NAME.	COLONY OF.	PRODUCTS.

3. Locate the Virgin Islands. How were they acquired by the United States? What is the chief value of these tiny isles to our large country?

4. Which of the West Indian Islands would you prefer to visit? Why? 5. What has the United States Government done to guarantee good government in Cuba? 6. What is the distance from Havana to New York? to New Orleans? to Galveston? Name the products exported from Havana to each of these cities; the products imported from these cities.



Photo. Underwood & Underwood, N. Y.

Fig. 308. The steamship *Paris*, a great French ocean liner. Tugs are pushing her into the dock in New York harbor. The size of people on deck help you to see that a ship is the greatest moving thing man has made.

7. Arrange with your classmates a West Indian exposition. Have a boy and girl come as natives from each island. Let them bring products and tell about their home lands. Perhaps you can get help from an encyclopedia.

THE TRADE OF NORTH AMERICA

392. The new world of lands.—Christopher Columbus and the other brave explorers found a new world of lands. A new world of trade came later. The explorers showed the people of Europe a new sea route to India, and they proved that there were such lands as North America, South America, South Africa, and Australia. But these discoveries did not make much difference in the lives of

men because machines, railways, and steamships were lacking.

Even in George Washington's time, men were still getting the six classes of goods (Sec. 1) in the same way as they had a thousand years before. Man still had to depend upon his own muscles, his beasts of burden, the wagon, the sailboat, the flatboat, the windmill, and small waterwheels. They were all the help he had. Living under such conditions, men could not easily



Photo. Ewing Galloway, N. Y.

Fig. 307. Where is the Mississippi River steamer pushing these grain barges?



Fig. 309.



Fig. 309.

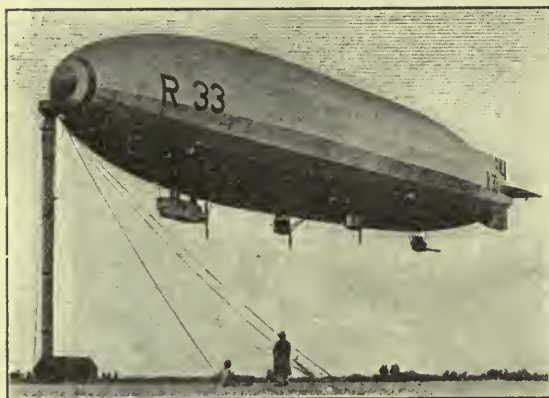


Photo. Central News Photo Service

Fig. 310. A dirigible balloon anchored to its hitching post. How many engines and propellers does it have? Is the weather clear or stormy? What advantages has the dirigible over the airplane? (Fig. 312.)

travel far from home, so there was not one white settlement north of the Gulf of Mexico until several generations after the discovery of America. For the same reason, almost all of the white people in America still lived east of the Appalachians for the first three hundred years after Columbus's time. Men had to live in places from which the farmer's wagon could take loads of wheat and pork down to some river such as the Mohawk, the Connecticut, the Susquehanna, or the James. There the produce could be put on a flatboat so that it might float over the riffles and low rapids down to the fall line, where sailing vessels waited to take the produce to Europe or the West Indies.

In that time the chief exports of North America were wheat, flour, pork, codfish, and a little lumber. The foreign trade was very small indeed, and the trade among the different parts of the country was even smaller.

393. The great inventions.—During the hundred years after George Washington's time many great inventions were made. In that century America saw its first steamboat,



canal, railroad, telegraph, telephone, electric motor, gas engine, and automobile. Many, many different kinds of machines gave man power

Fig. 311. Wheat Production 1919-20:

A. United States	861,000,000 Bushels
B. Canada	242,000,000



Courtesy U. S. Air Service

Fig. 312. An airplane mail station near New York City. Name three common means by which mail is transported. What are the advantages of airplane transportation over each of these methods? The disadvantages?

to conquer nature. Most important of all was the general use of the steam engine to drive factory machinery.

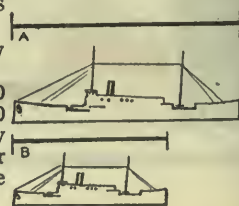
394. The rush for new lands.—As one invention after another gave new power, the white men, who had lingered for two hundred years close to the Atlantic Ocean, became more and more able to transport goods over mountains, rivers, lakes, and plains, and to make new homes where wilderness had been. Then, instead of living as Dave Douglas lives, they could send produce to market. When men could *send* much produce instead of having to *go* and take a little, they could live in distant places. Then the rush for the west began. The heart of North America was settled with great speed. Ohio became a state in 1803; Iowa in 1846; Colorado in 1876; North Dakota in 1889; and the farmers are still settling the new prairie in western Canada. (Sec. 92.)

395. The new world of trade.—Now that man can ship almost anything anywhere, nearly all the people of North America live by producing a few things suited to their own region and sending them in trade to other regions. This is

Fig. 313. Wheat exports, yearly average (million bushels):

A. United States (1918-20)	150
B. Canada (1917-18)	100

Compare with Fig. 311. Why does Canada export a greater share of her wheat than the United States?



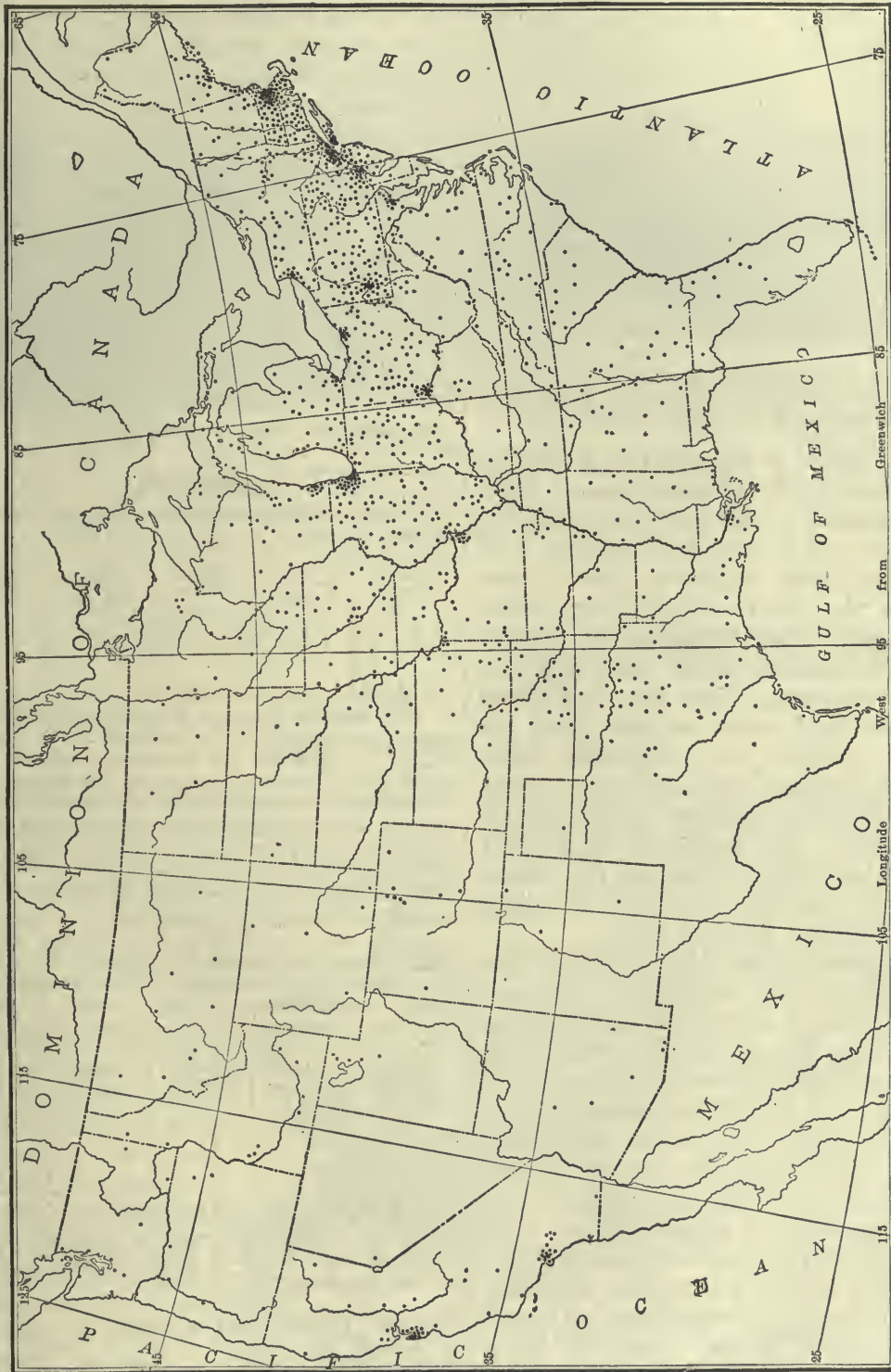


Fig. 314. This map shows the location of all cities of over 5000 population. Can you name the central city of each group of cities? Compare this map with the rainfall map of the U. S., Fig. 158; with the railroad map, Fig. 494; and with the occupation map, Fig. 467.



Photo. Brown Bros., N. Y.

Fig. 315. A passenger steamer on the American Great Lakes. Name the cities at which this great ship might call on a trip westward from Buffalo to Duluth. (Fig. 54.)

really a division of industries or a division of labor among the different regions. Each region tends more and more to produce the few things that it can best produce, and to buy from other regions in this or other countries the many, many things which other places can better produce.

396. The manufacturing areas and the raw material areas.—Since the great inventions have been made we have built up in North America one large area where manufactures are more important than in the other parts of the continent, which produce raw material. This manufacturing area lies between the Atlantic Ocean and the Mississippi River, and between the Great Lakes and the Ohio and Potomac rivers.

397. Foreign trade.—North America has many regions, with all ranges of climate, from the tropic fields of cane and bananas to the tundra pastures on the Arctic shores. Yet we have need for many of the products of other lands. If you do not remember them, look up the places (Fig. 9) from which come silk, tea, coffee, wool, ivory, ostrich feathers, palm oil, fine wool cloth, and laces.

398. Thousands of helpers.—If we could see assembled in one place all the people who have helped in some way to make the things for sale in one little country store, we should see thousands of people. And other thousands have helped in the transportation.

By day and by night, thousands of loco-

motives never cease from chugging as they pull across mountain, plain, and river train-loads of goods that keep alive the trade of our inland regions. On the rivers and lakes big steamboats with clouds of black smoke pouring out of their stacks are helping to carry the materials of trade. Ships are on every sea. They pass from the Pacific to the Atlantic, and from the Atlantic to the Pacific, through the great gates of the Panama Canal. Each day ocean steamers glide into the ports of our country, bringing the produce of other lands. If the people of the world would all work and treat each other fairly, present trade possibilities are such that every one might live very comfortably.

QUESTIONS

1. Review briefly your North American regions as follows: (Figs. 21, 91, and 210 will aid.)

NAME OF REGION.	THREE PRODUCTS EXPORTED.	WHERE SENT.	THREE PRODUCTS IMPORTED.	ORIGIN OF IMPORTS.

2. Why were the owners of the great transcontinental railways unfriendly to the building of the Panama Canal? 3. How did the Mississippi and the Ohio rivers aid in the early exploration and settlement of our country? Which would be of more value to our country to-day—the dredging of the Ohio-Mississippi waterway, or the building of another railroad along the banks of the Ohio and Mississippi? Give reasons for your answer. 4. How have the railroads helped to knit our country into one nation?

5. Will the airplane (Fig. 312) and the dirigible (Fig. 310) ever be the efficient servants of trade that the railroad and steamboat (Figs. 122, 308) have been? Explain fully.

6. From Fig. 9 complete the following outline:

NORTH AMERICAN SEAPORTS.	ARTICLES EXPORTED.	DESTINATION OF EXPORTS.	ARTICLES IMPORTED.	ORIGIN OF IMPORTS.

7. Europe is older than the United States. Why are her people poorer than those of this country? In which region or regions would you advise an immigrant to settle? Why?

Fig. 316. Population per sq. mile:

A. Europe	117
B. United States (1920)	35
Does this explain anything about wealth and about the trade between the two continents?	

A
B



Courtesy "The World's Markets"

Fig. 317. A view of the harbor of Glasgow, on the River Clyde. The river here was so shallow a hundred years ago that horses could wade across. Much hard work was necessary to dig out a good harbor for Glasgow. Would you say that the Scotch are good workers?

EUROPE AND THE MEDITERRANEAN REGIONS

THE CONTINENT OF EUROPE

399. The mother of nations.—Europe is the smallest of the inhabited continents, except Australia, but the people of Europe and the people who have recently gone from Europe rule most of the world. (Fig. 10.) Europeans have settled North and South America and Australia.

400. A very good continent.—European races have gained this great leadership in the world, because Europe, for its size, is the best continent for making energetic civilized men. No other continent has, on the whole, a climate that is as good for man. In no other continent is such a large part of the land

good for farming and manufacturing, and so suitable for easy transportation.

401. Good climate and surface.—Much of North America is too cold to support many people. In Europe, the cold region is small. North America has a large dry region. The

European dry region is less than one-tenth of the continent. Europe has a larger wheat belt than America, a larger potato belt, and a larger territory where the fruits like those of California can grow. North America has a much greater corn belt than Europe, and it has two things that Europe lacks entirely, (1) a

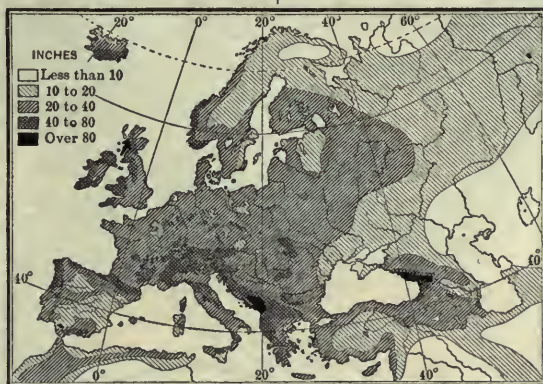


Fig. 318. A map showing the annual rainfall of Europe. Compare with Fig. 144, and suggest the character of rainfall in Europe if there were a mountain range along its western coast.

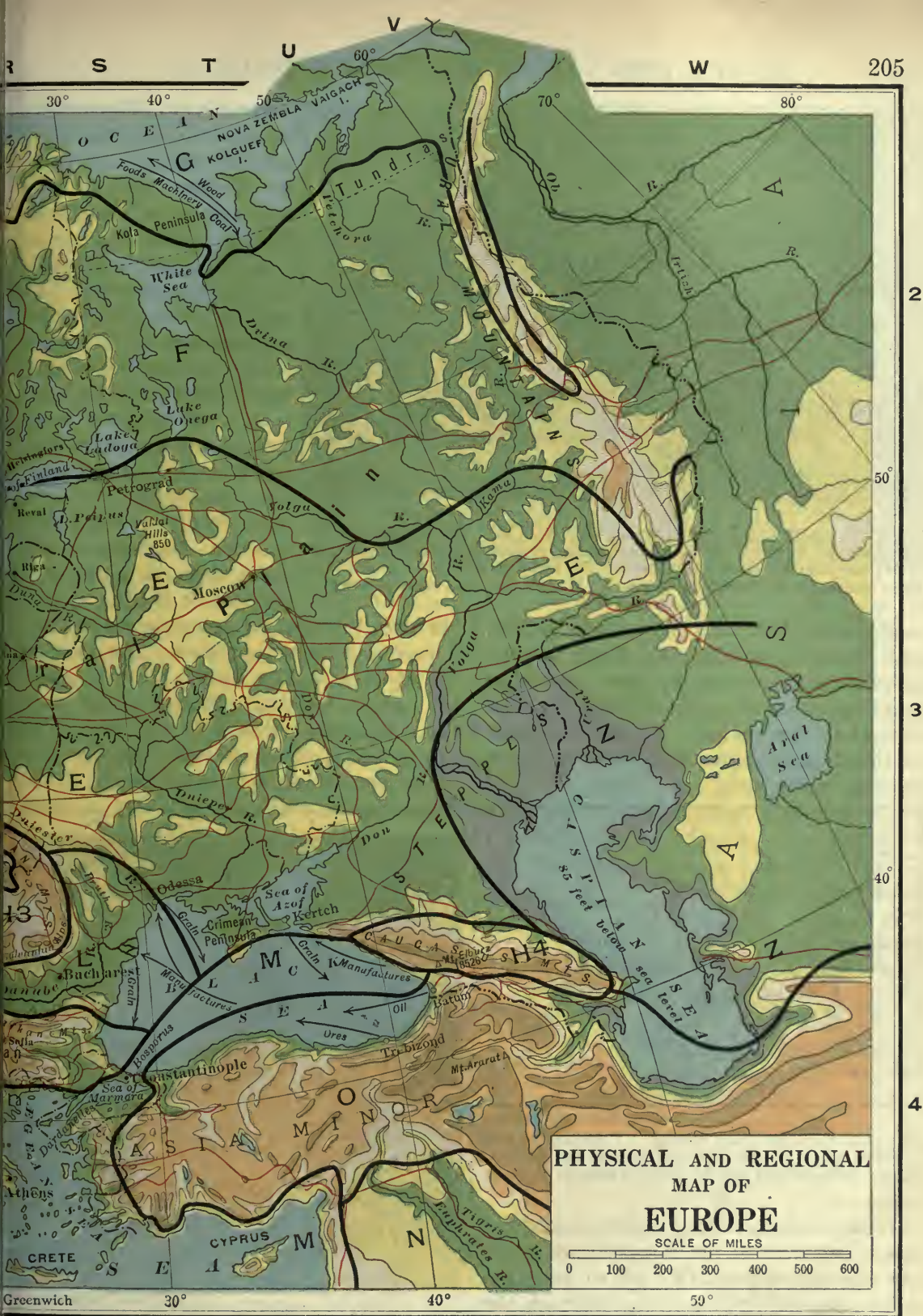


Fig. 319.

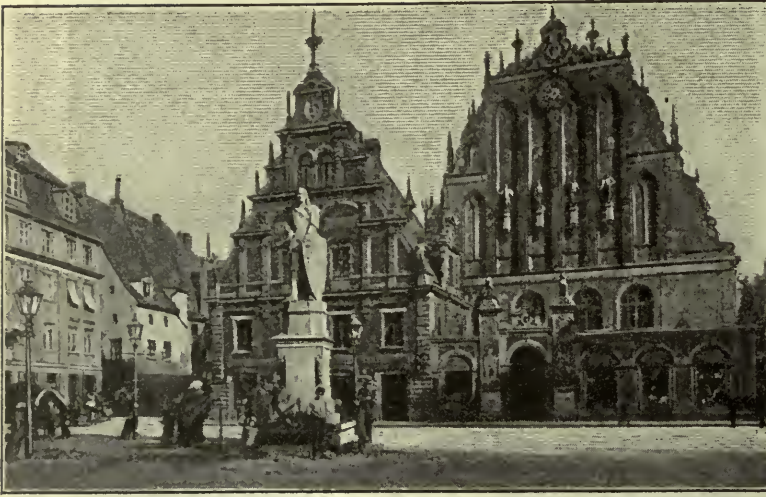


Photo. Wm. Thompson

Fig. 320. Public square in the city of Riga. Note the old town hall with its many bits of statuary; the guild hall where associations of business men meet; the great statue of a local hero. The buildings about the square have stood unchanged for hundreds of years. Why do the roofs slope so steeply?

large cotton belt, and (2) a great section with moist, tropic climate. While Europe lacks a tropic section, we must remember that it is in the tropic part of North America that white men are few. Europe is the only continent whose climate nearly everywhere suits the white man.



Finch & Baker, U. S. Dept. Agr.

Fig. 321. Europe's wheat acreage. Compare the size of wheat areas in North America (Fig. 88) and Europe. Name the countries which export wheat to western Europe.

In addition to having a *climate* good for crops and for men, the *shape* of Europe and the character of its surface help to make it a good place in which to live. Through the center of the continent, reaching from the Atlantic Ocean to the boundary of Asia, lies

a low plain. Throughout its great extent the plain has rain enough to reward the farmers who till the soil, and grass enough to feed the flocks and herds. It is only near the Caspian Sea that the grassland, like some of our own great plains, is too dry for grain crops. Crop failure and famine sometimes happen here.

402. Europe has more people than any other continent except Asia.—Europe has about three times as many people as all of North America. As Europe is only about half as large as North America, it is plain that it

has much less land per person, so we say that Europe is densely populated. The average size of farms in the United States is about 130 acres, while in France it is only about 14 acres, and in Italy still less. The size of the farms in Europe tells why the people are not so rich as the people of the United States, and it also tells why so many



Photo. J. Russell Smith.

Fig. 322. The work dog and peasant woman, pulling side by side, brought this wagon load of produce from the country districts to the Leipzig markets.

people from every country in Europe have come to America seeking homes.

403. Many nations.—In the days before steamships and railroads, sheltered places, like mountain valleys, peninsulas, and islands, helped the inhabitants to defend their land and to protect themselves while they tilled the fields, educated their children, built cities, and developed a civilization. In Europe, countries like Greece, Italy, Switzerland, and England were thus protected for a long time. Their peoples have developed languages of their own and a strong national spirit. Because Europe has so many of these naturally protected pieces of land, many different nations have grown up.

We are very fortunate indeed that most of the United States was settled after the railroad and the steamboat made it possible for a wide area to become one country with one language, rather than fifteen or twenty countries and languages, as in Europe.



Photo. Publishers' Photo Service, N. Y.

Fig. 324. Slovak embroidery workers, Czechoslovakia. The women draw their own designs freehand, and then make them in embroidery.

404. A continent of interesting sights and sad wars.—The peoples of Europe are proud of their cities, their buildings, their statues, their books, and their traditions. Most of the world's greatest paintings, sculpture, and music have been produced somewhere in Europe. The peoples of Europe have been settled where they now are for a period of time long enough to allow many things to happen.

That is one reason why Europe has so many places we want to visit. Travelers there may visit cities that are one or two thousand years old. They may see interesting buildings that were built before the time of Columbus, great walls and ruined forts that tell stories of many wars fought in times long past. Indeed, the people of Europe suffered untold miseries and died by millions, because of the hundreds of wars that the different nations and kings of Europe have had among themselves.



Fig. 323. This map illustrates for you the density of population in the various parts of the world. Each dot represents 500,000 persons. Give two good reasons why Europe, the smaller continent, has a larger population than North America. From Figs. 144, 328, and 329 suggest causes for the sparse population in Canada and western United States. As you study Asia, Africa, South America, and Australia, recall this chart and tell why few people live in certain areas, and why many people live in other areas.



Fig. 325

405. Studying Europe.—Europe has many regions that are much like the regions in North America. As in North America, so also in Europe we find an area of manufacturing and other areas producing food and raw materials. Can you tell from the population map (Fig. 323) where the manufacturing area is located?

QUESTIONS

1. Why do we call the language of America the English language? Make a list of the countries in which the ancestors of members of your class or people you know were born. Where are these countries located? Which countries are peopled by the Latin races? Which are peopled by the Anglo-Saxon races? How is it that the ancestors of so many Americans came from Europe? Why is Europe called "The Mother of Nations"? Watch the newspapers to see from what countries new immigrants are constantly coming. 2. Compare the physical map of Europe with that of North America. In what direction do the principal mountains run? Where are the highest mountains? What is the shape of the great lowland region? 3. If you were planning to visit Europe, by what route would you go? From what Atlantic ports do the great liners sail? How far is it from New York to Liverpool? How long would the trip take? 4. Is there any necessity of life which is wholly lacking in Europe? 5. What grain in Europe do you think would be used for food for hogs and cattle in the way corn is used in the United States?

6. Why are there so many countries in Europe? What countries are separated by the Pyrenees? by the Alps? by the Caucasus? Where is Europe's cold region? Where is her dry region? Compare her wheat

belt with that of North America; her potato belt. 7. In which continent, Europe or America, are there more people living? Give as many reasons as you can for this difference. Why do European people come to the United States?

8. What can we learn from Europe in the matter of transportation? As you study paragraph 401, print the names of the canals and the rivers that help you to travel by water across inland Europe. 9. Why are Americans very much interested in studying about Europe?

THE GREEN NORTHLANDS

406. Scattered lands of green grass, flocks, and fish.—What islands lie between Scotland, Norway, and Iceland? (Fig. 319.) These islands together with Iceland, west Norway, and the northern part of Scotland are covered, where there is any soil, with green grass, bushes, or trees. The summers are so cool and wet that it is almost impossible to plow the ground and grow grain. But all this moisture is good for grass, and there is scarcely another place in the whole world where grass is so very green. Flocks of sheep and herds of shaggy cattle and short-legged, thick-coated ponies are a source of wealth. Animals in this region can run at pasture for more months in the year than is possible in New York State. When snow covers the ground, they are fed on hay that is made with great labor (Fig. 330).

The inhabitants of the Northlands are brave and hardy sailors whose chief industry is fishing. They catch quantities of cod and herring, which they dry or salt for export.

Most of the people live in stone houses roofed with thatch or sod and heated with peat fires (Fig. 333).

407. Sailing in northern seas.—Every summer, steamers carrying tourists sail from New York to Iceland. After sailing around that island, the boats go on to the northernmost tip of Europe. What cape forms the tip? (Fig. 325.) In the



Fig. 326. Pulling in the net in a Norwegian fiord. Where may the salt herrings be eaten? Did you ever hear of Norwegian cod liver oil?



Fig. 327. The courses of the ocean currents. What two kinds of currents are illustrated on the map? Name the kind which washes the shores of western Europe; of Labrador; of Chile; of western North America. Trace the path of the Gulf Stream.

same latitude the seas of North America are so full of floating ice that in three centuries of trying, only one explorer has sailed his boat across from the Bering Strait to Davis Strait, and the voyage took three years of hard work. (Sec. 359.)

What makes such a difference? The answer is *ocean*, and *currents*. The Gulf Stream is a great current of warm water that flows from the tropic part of the Atlantic Ocean (Fig. 327). The trade winds of the Atlantic blow a current of warm water into the Caribbean Sea. This current forces its way into the Gulf of Mexico and, like a great river within the ocean, flows out between Florida and Cuba as fast as a man can walk, and carries eighteen hundred times as much water as the Mississippi river. This ocean river or stream can be traced northward as far as Newfoundland. The prevailing westerly winds carry some of this warm water on past England, past Norway, and into the Arctic Ocean. When it reaches northwest Europe it is still warm enough to cause the winter temperature to be much less severe.

Labrador, in the same latitude, is very, very cold. Why? (Fig. 327, Sec. 251.)

Examine the winter-temperature map (Fig. 329), and then pick out a city in Iceland, three cities in North America, and three in Europe that are near the January isotherm (equal temperature line) of 32°.

How many degrees of latitude and how many miles lie between the northernmost place and the southernmost place having a January temperature of 30°?

408. A warm north coast.—In winter the bays along the Labrador coast and the harbor of Vladivostok are frozen shut, but the harbors along the entire Norwegian coast are open because the warm water of the eastern Atlantic Ocean keeps them from freezing. During the World War it was found that when Archangel was closed by ice, the little Russian port of Murmansk on Kola Bay in Lapland was open. (Fig. 325.) A little of the warm Gulf Stream water slips around the North Cape and keeps the ice away.

409. A cool, damp summer, and a raw, mild winter.—Look at Figs. 328 and 329; you



Fig. 328. A world chart showing the average temperatures for July. The wave-like east-west lines are called isotherms. Those on this map connect places having the same average temperature for the whole month. Compare the location of the hot areas on this map and on Fig. 329.

will see that the summer is warmer and the winter is colder in the great forests of the Mackenzie Valley and central Siberia than it is in Iceland, west Norway, or the north of Scotland. The long hours of sunshine heat the land surface quickly, but the sea is heated very slowly. There are several reasons for this, one of which is that the stirring of the water by the wind causes the sea to be warmed to a greater depth than the land. Another reason is that more heat is required to raise the temperature of a given amount of water than is needed for the same amount of earth. Water holds its heat longer, and therefore oceans and other large bodies of water are warmer in winter and cooler in summer than is the land. The west wind, warmed by the ocean in winter, gives the green Northland region a winter that is cool but not cold. In summer this same ocean cools the wind and gives the green Northland a summer that is almost as cool as the winter (Figs. 328, 329), besides having much dampness and rain.

Those countries which have a cool summer and a warm winter because they are near the ocean from which the prevailing wind blows, are said to have an oceanic climate. What is the difference between the average temperatures in July and January in west Norway? in east coast Siberia? in central Siberia?

410. The Icelanders.—The Icelanders, who are of Norwegian stock, have been on their island for over a thousand years. For a long time Iceland was a colony of Denmark, but now it is independent. The people are highly educated. It is said that people in Iceland buy, read, and write more thoughtful books than the same number of people anywhere else.

411. The Norwegian coast.—The coast of Norway resembles the coast of British Columbia and Alaska in latitude, climate, and roughness. The greater part of this coast once sank deep into the sea, and only the tops of the mountains remain above water. As the coast sank, the sea came in and filled up the valleys between the mountaintops, making deep bays, called fiords. Some of

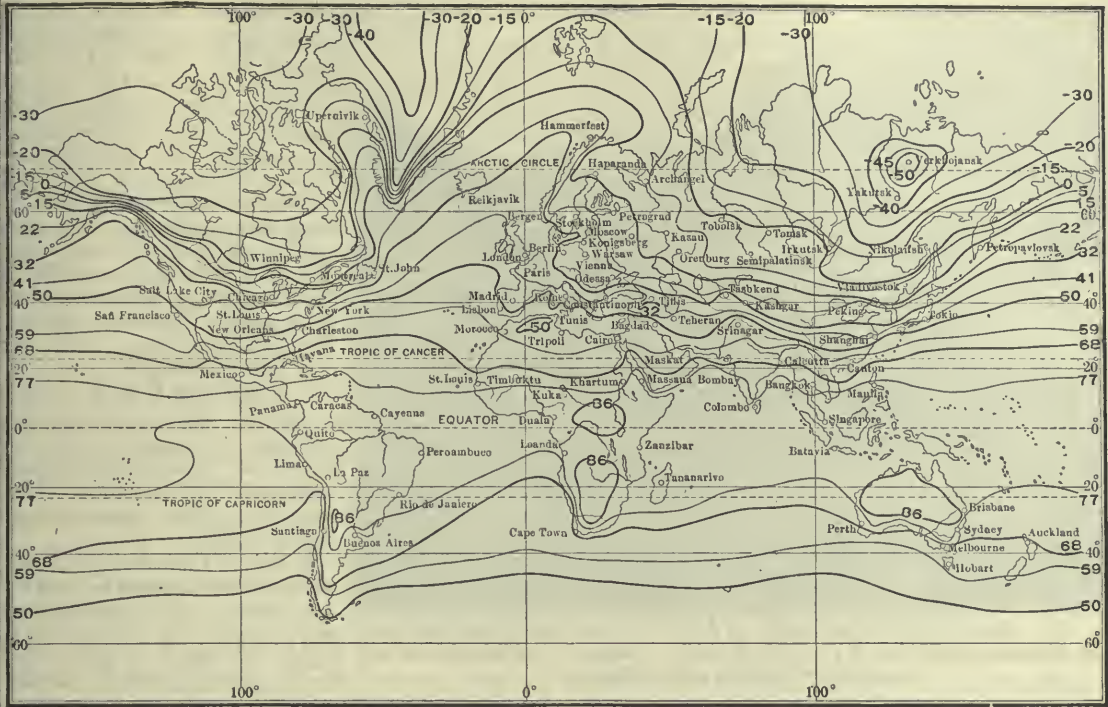


Fig. 329. A world map showing the average temperatures for January. What is remarkable about the location of isotherm of 32°? What does it explain about harbors at Vladivostok, Bergen, Montreal? Give the temperature of the coldest place in the world. Can you find any influence of ocean currents on this map? (Fig. 327.)

these fiords reach back a hundred miles from the seacoast. The shores rise steeply from the water's edge, leaving scarcely room enough for a house. Where there is a little flat place, you may see fishermen's houses, or here and there the home of a man who has a tiny farm. All the people of western Norway live along this shore. In summer, many of them fish for herring or cod, or pasture animals on the mountain grasslands. In winter they cut timber on the forested hills. The Atlantic waters make Norway warm enough for forests on the lower slopes of the mountains, but Iceland, being nearer a cold current that creeps down the Greenland coast, is so cool in summer that only dwarf trees will grow there.

412. The tip of Scotland and the islands near it were once forest covered, but long ago the forest was cut away to make room for pasture (Sec. 406).

413. Unused resources and shipowning.—The people on these scattered isles and shores have little room to raise more sheep

and cattle unless they buy the feed for them, but they can catch more fish if the demand for sea food should increase.

This Northland is a poor place in which to start a new business, but since the Norwegians are a nation of fishermen, and often buy ships with money they wish to invest, many thousand Norwegians are sailing on distant seas, carrying freight of foreign countries. Our bananas are often brought to the United States from Central America and the West Indies in Norwegian ships, manned by Norwegian sailors. With the money that her ships earn, Norway pays for many things she buys in other lands.

The American Consul at Kristiansund, Norway, said of his consular district: "These counties constitute the extreme southwestern corner of Norway and have a coast line more than 200 miles long. The land surface is a mass of solid rock. Small patches of soil have accumulated in narrow valleys and along the rivers, but only about one-half of one per cent of the total area is actually



Fig. 330. Putting hay on the fence to dry in a damp Norwegian mountain field, because it will not dry on the ground. Compare the amount of hay per day's work here and in Fig. 73.

under cultivation, and the farm land, including hay and meadow lands, constitutes only slightly more than two per cent of the total land area. The people live from the sea, as fishermen and sailors, and large shipping concerns have grown up in the coast towns, whose fleets trade on all the seven seas and whose vessels rarely see their home port."

Iceland and west Norway have another resource. Much water power is furnished by the streams that tumble down from the snowfields on the highlands. Already there are many power plants in Norway (Fig. 405). Norwegian capitalists are planning to build a series of six water-power plants in Iceland, to yield more power per person for Iceland than we have developed per person in the United States in all our factories. It is possible that the Icelanders may use the electric current to make fertilizer (nitrates), or to smelt ores, as the people of Norway do; or to run factories and live much as the people of New England do.

QUESTIONS

1. Why are these scattered lands studied as one group? 2. Compare the climate of this region with the climate of the west shores of the Atlantic in the

same latitude. Why is the pasture season longer here than in the state of New York? What coast in North America has climate similar to west Norway? 3. What other coast that you have studied is somewhat like the coast of Norway in formation? (Fig. 165.) 4. Why do the people of Norway have more ships than the same number of people in the United States? 5. Why are the people of the Northlands fishermen? Of what people in North America do they remind you? Why are they hardy seamen?

6. If you should go to Iceland to live, in what business would you like to engage? 7. Do the people of Iceland have much commerce? If so, with which countries? What have they to trade? (Fig. 9.)

8. Locate a place in this region where daylight lasts 24 hours on June 21st. 9. Give two reasons why people like to visit this region. 10. Read stories of Odin, Thor, and others that the old

Norsemen have given to us. Try to find out who some of the writers of Iceland are.

THE UNITED KINGDOM

414. The region.—England, Scotland, and Wales make up the island called Great Britain. These countries, together with Ireland and about five thousand smaller islands near by, are spoken of as the "United Kingdom of Great Britain and Ireland." People often say England when they mean the United Kingdom. This kingdom and its many possessions (Fig. 10) in all parts of the world comprise the British Empire.

We have already studied about the north of Scotland and the most northern British islands, the Hebrides, the Orkney, and Shetland. (Sec. 406.)

415. The surface.—The British Isles were once almost entirely covered by a great glacier, just as were parts of North America. This ice-sheet caused many lakes in Ireland, Scotland, and the north of England.

Most of Scotland is made up of two highlands. The southern highlands of Scotland extend on into England as a low range that reaches to the center of the country. Nearly all of Wales is mountainous. How high are

Fig. 331. Wheat yield per acre in bushels

A. Belgium.....	38.0
B. Germany.....	34.3
C. United Kingdom.....	31.3
D. France.....	20.4
E. United States.....	15.5

the mountains of Wales? of Scotland? What mountains in the United States are about the same height? (Fig. 309.)

The south and east parts of England are a level or gently rolling plain. Much of it was once swampy and was called the fen, but it has been drained by ditches and is now farmed.

Most of Ireland is a plain with many peat bogs (grassy swamps) near the lakes, and low ranges of hills along the coasts.

416. Climate and energy.—The United Kingdom lies in the path of cyclonic storms (Sec. 59), such as we have in the United States. Indeed, many of our storms travel across the Atlantic and over Britain before their long journeys are completed. A geographer, Dr. Huntington of Yale University, says that the changes in the weather which occur with the passing of these storms are very important indeed for the health and energy of men. The changes from cool to warm, from rain to clear, make people feel like doing things. Perhaps this changing weather helps to explain the energy of the British. Certain it is that the people are energetic in work, in trade, in exploration, and in play. From them we got football, cricket, tennis, polo, golf, and the muscle-building rowing race.

417. Climate and crops.—If we compare the climate of the British Isles with that of eastern North America, we shall see how different the two sides of an ocean can be (Fig. 329). All England lies farther north than does the island of Anticosti in the Gulf of St.

Lawrence (Fig. 210). We found in Section 251 that Anticosti is too cold for farming, yet England, still farther north, is one of the best agricultural countries of the world. In the cold waste of the interior of Labrador there is not one farmer or one flock of sheep or one herd of cows. Yet directly across the Atlantic Ocean, in Scotland, flocks of sheep graze in rich pasture in summer; in winter there is so little snow that they sometimes live without shelter, pasturing on the damp Scotch hills.

This oceanic climate (Sec. 409) gives western Europe surprisingly warm winters and cool summers. England cannot grow corn in these cool summers; but, in all parts of the islands where it is not too damp (Sec. 406), the small grains—wheat, oats, barley, and rye—flourish, as do potatoes, peas, and most garden vegetables.

418. Agriculture.—Wheat and milk.—What is the rainfall of Wales? of the Eastern Plain of England? (Fig. 318.) Why the difference? (Figs. 340, 157.) Eastern England is one of the finest wheat countries in the world. The English wheat yield per acre is over 30 bushels, while in the United States it is about 15 bushels. Despite her fine yield, England is not growing as much wheat as she did a hundred years ago, because her people are now busy with manufacture. The United Kingdom has so



Photo. Brown Bros., N. Y.

Fig. 332. A country home in beautiful rural England.



© E. M. Newman

Fig. 333. An Irish peasant's cottage and barn with strong stone walls and thatched roofs. Name some product the farmer will sell.

many people that much of her agricultural land is in dairy farms producing milk for her many city people (Sec. 425). Why? (Sec. 95.)

Wales, northwestern England, and the southern lowland of Scotland are lying much of the time under clouds, mist, and showers. The land is too wet for the plow, but good for grass. Here, on the treeless green hills, is the shepherd with his big woolen coat, his staff, his flock of sheep, and his collie dog. Even some dairy farms on the level clay lands near Liverpool are not plowed at all, because one rain follows another before the sticky soil can dry enough for planting. In addition to grass, the cows eat hay and grain, which are brought by ship to Liverpool.

419. Irish agriculture.—Clouds, fog, and showers furnish so much moisture that Ireland is rightly called the Emerald Isle, because its fields are so very green. The island is too wet to suit wheat, but grass, potatoes, and oats (Figs. 354, 378) grow well. Most of the Irish people are farmers, busy with herds of sheep, cattle, and swine, and flocks of chickens. From the farms of Ireland, milk, but-

ter, bacon, and eggs go to the cities of England. The houses in the country are often built of stone, and have roofs of thatch (Fig. 333). The household fires burn dried peat, of which the many bogs of Ireland furnish plenty. (Fig. 336.)

420. When England was an agricultural country.—At the time of Columbus, the Low Countries, now called Holland and Belgium, were greater manufacturers than was England, and

were very famous for their woolen cloth, much of which was made from English wool. At that time England was still an agricultural country, and wool from her flocks was the chief article of export. Then the southeastern plain (Fig. 340) was the richest, most populous, and most important part of England. For centuries southeastern England was the home of the rich gentlemen of England. They owned large estates, and there are still many old mansions (Fig. 332) with beautiful grounds scattered about this farming region. The novels of Sir Walter Scott will show you that in 1750 the western and northern parts



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Fig. 334. Muck Ross Abbey, Killarney, Ireland, one of the many ruins that date back to the time of Columbus.

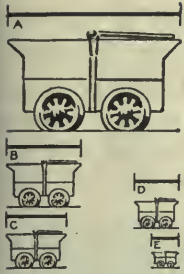
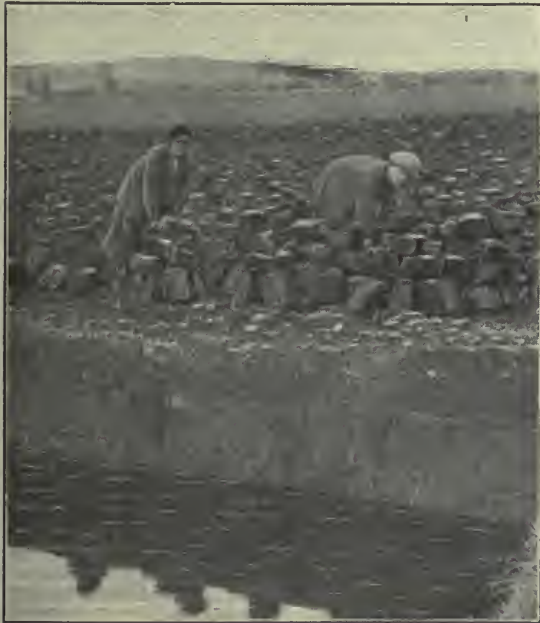


Fig. 335. Five leading countries in the production of iron ore (1913):

	Tons
A. United States.....	61,000,000
B. Germany.....	26,000,000
C. France.....	21,000,000
D. United Kingdom..	15,000,000
E. Spain.....	9,000,000

of Great Britain were thought to be a kind of wild frontier.

421. The age of coal.—In 1740, an Englishman succeeded in making a steam engine that would burn coal and pump water out of a coal mine. In the next sixty years other inventions were made, and spinning and weaving machines could then be driven by a steam engine or water wheel. In a short time these new machines entirely changed the manufacturing industries of the country. Cloth was no longer made by hand in the roadside cottages of the farming regions, where food was grown close by. It was made instead in big buildings near the coal mines or waterfalls. A few loads of coal could furnish power to run a hundred machines at once. Mines were dug, factories were built, and towns grew. To-day



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Fig. 336. The chunks of peat cut from the Irish bog are being dried for winter fuel. What might happen to turn the peat bog into coal? (Sec. 286.)

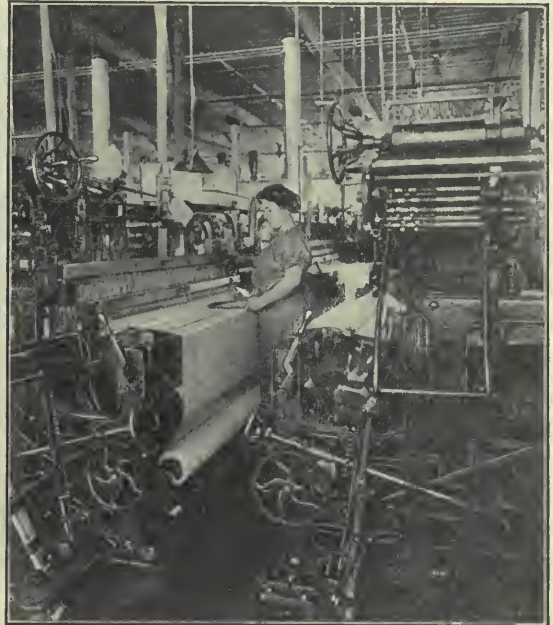


Photo. Brown Bros., N. Y.

Fig. 337. A loom weaving woolen cloth for export. The weaver has in her hand one of the bobbins on which yarn for the cloth is wound. Name the countries from which this wool may have come.

the coal fields, not the grain fields, have the denser population, and the wild country of Sir Walter Scott's time is now dotted with manufacturing cities.

No other country in the world was so well adapted as England to use coal and to build up factories in the days before the railroad came. In the United States the coal field nearest to the sea is a hundred miles inland. Britain has coal fields beside the sea: at Newcastle on the northeast coast, at Cardiff in south Wales, near Glasgow in west Scotland, and also in northwest England. These coalfields are now busy centers of mining and manufacturing. Before men had steamships or railroads, England could import cotton and wool in sailing vessels, and land these raw materials close beside her coal mines and her factories, to be made into cloth. Ships could then easily take the cloth to markets over the sea. When the locomotive was invented, British manufacturers had already made a good start, and for a hundred years England was the greatest manufacturing country in the world.



Fig. 338. Spinning cotton yarn by the mile. How many threads do you think this row of machines makes? Compare with Fig. 3.

Courtesy American Woolen Co.

422. The cotton industry. — The little county of Lancashire, with its capital at Manchester, is no larger than the state of Delaware, but it is the world's greatest cotton-manufacturing center. Its damp climate helped the industry to start, because in damp air fibers may be twisted into thread without being broken. In Manchester and in the many towns near it one can now hear almost all day long the clack, clack, clack of looms, and the whir of spinning machines. The phrase "Manchester goods" means cotton cloth to millions of black men in Africa, brown men in India, yellow men in China, dark-skinned Indians in South America, and negroes in the West Indies. In 1919, the total British export of cotton cloth would have provided thirty yards for every man, woman, and child in the United States.

The people of Manchester built a ship canal from their own city to Liverpool, so that they could get cotton and other supplies more directly. This canal is thirty-five miles long, and large enough for ocean steamers. What effect does this have on the cost of carrying American cotton to Manchester?

423. Other textiles. — East of Lancashire is Yorkshire. It is as famous for its woollens

as Lancashire is for its cottons. Leeds, Bradford, Huddersfield, and York are full of mills making woollen cloth which tailors will tell you is as fine as any in the world.

Each year the town of Dundee, on the east coast of Scotland, imports shiploads of jute fiber from India (Sec. 693) and weaves from it millions of yards of gunny sacking or burlap.

In the northeastern part of Ireland is a great linen-manufacturing center. Damp climate has helped to make Irish linen famous. If the air is dry the linen thread may break, but Irish

climate is damp and the thread does not break; so the weaving can be smooth and even. A hundred years ago linen was made by hand in almost every Irish home, but when the power-loom came, weaving was done in factories. The city of Belfast then became the leader, and now much fine linen is made there. Most of the flax fiber, the raw material for linen, is imported from Poland.

424. Iron, machinery, and ships. — Birmingham and surrounding towns stand near the central coal fields of England. This region, like that between Pittsburgh and Detroit, makes iron and steel. From these are manufactured automobiles and many other kinds of heavy goods. Sheffield, farther north, is the great center for the manufacture of cutlery and fine steel articles.

England is the greatest ship-building country in the world. As

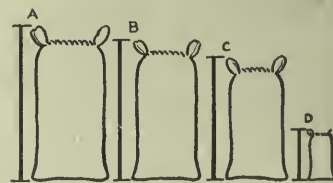


Fig. 339. Relative amount of wool imported (1909-13 average) by:

	Million pounds
A. France.....	601
B. United Kingdom...	500
C. Germany.....	481
D. United States.....	203



Fig. 340.

ships must be built where they can slide into the water, England, having many bays, rivers, and harbors, as well as coal and iron, is an excellent place for this industry. On her northeastern coast, the towns of Newcastle, Tynemouth, Sunderland, Hartlepool, and Middlesbrough have coal at their very doors, and docks where ships can unload iron ore from Sweden, Norway, and Spain. Thus these towns can supply the iron for ships, and dig coal to run the machinery of the shipyard. When a ship is built, it can slide into the water, take a load of coal, and sail away to a foreign land. Glasgow and the other towns on the Clyde have the same advantage. The Clyde is the greatest shipbuilding river in the world. Another great shipbuilding center is Belfast, in northwest Ireland, to which coal can easily be brought across the narrow waters from Glasgow.

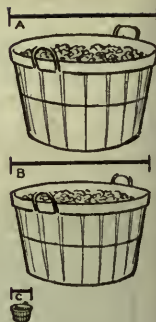
British coal also feeds the smelting industry, for many ores of copper and silver are shipped from other lands to places like Cardiff for final smelting.

425. Living in cities.—In England and Scotland there is so much manufacturing, and so many people are living by trade, that most of the people live in cities. No other place, except parts of our own New England (Sec. 238), has so large a part of its population living in cities. Many of these factory

Fig. 342. Bushels of grain produced per person (1911-13):

A. United States.....	50.8
B. Canada.....	47.7
C. United Kingdom.....	6.7

Does this explain anything about trade?



towns are so crowded and unwholesome that many young men have been found to be unfit when examined for army service. Helpful people are now trying to change these conditions, and already one small English factory town called Garden City (Letchworth), near London, is the best-planned town in the world. (Fig. 347.) It was started by a stenographer, who had a vision of a city that for living might be like the country and for business like the city. His dream came to pass, because he worked and persuaded others to help him. Every house in this town is near to the factories, near to the playgrounds, and near to the fields where food is grown. The men who work in the factories can all have gardens, can play outdoor games if they want to, and can walk about in the country. There should be more such towns; then factory workers would have better health and more recreation and pleasure in their lives.

426. Recreation.—Football is played all winter in Great Britain, for their oceanic climate (Sec. 409) does not have frost enough to stop it. A hundred thousand people sometimes go to see a football game, and teams from neighboring factories often play matches on Saturday afternoons. The summer is cool enough for active games in the warmest months. Many athletic sports are played all the year, and you may see people of all ages cheerfully tramping about the country, even on rainy days. The English love to take walks and to row boats, and when, on holidays, the



Fig. 341. Trafalgar Square in the heart of London, named to commemorate a famous naval battle.

Photo. Keystone View Co., N. Y.



© Wm. H. Rau, Inc.

Fig. 343. The Thames River, and Windsor Castle, for many centuries the home of English kings and queens.

crews of Oxford and Cambridge, the two oldest English universities, meet for their annual boat race on the Thames above London, the river is so full of boats that they can hardly pass each other.

The British business man often has a side job, or hobby. Thus, a banker or a merchant may have a collection of butterflies or roses, and he may know more about these things than anybody else in his town. If they can afford it, British people often have attractive flower gardens. English country districts have many beautiful, green, smooth-clipped lawns, well-trimmed hedges, and stately shade trees. (Fig. 332.)

427. World location.—Look at a globe, or map of the world (Fig. 10), and find the place that is exactly on the other side of the world from London (longitude 180° E., latitude $51\frac{1}{2}^\circ$ S.). Then look at England. Which location is the better for trading with all the countries of the world? Why?

England is close to the mainland of Europe, but her sea boundary has enabled her to keep out of many wars that

have injured the countries of the mainland.

428. Coasts and harbors.—Like New York and New England the British Isles have many drowned valleys (Sec. 216). These arms of the sea make the best kind of harbor, and because the British Isles have so many of them it has been easy for the people to go to sea in ships and develop sea fisheries and trade.

429. Trade and shipping.—British factories produce goods not only for England but for many other countries. Thus England makes much of her living by ocean trade. Steamships from the leading British ports,—London, Liverpool, Glasgow, Hull, and Bristol,—take manufactured goods to every continent, and to almost every country in the world. These ships return with raw materials and food. Indeed, British trade has prospered so much that England has

come to live almost as New England lives (Sec. 238). In 1919, England imported from the United States alone three million dollars' worth of food each day in the year.

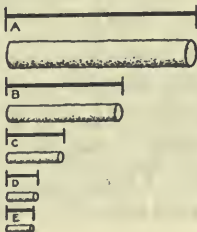


Fig. 344. The five leading countries in the production of pig iron (1913):

	Tons
A. United States..	30,000,000
B. Germany.....	19,000,000
C. Great Britain..	10,000,000
D. France	5,000,000
E. Russia.....	4,000,000

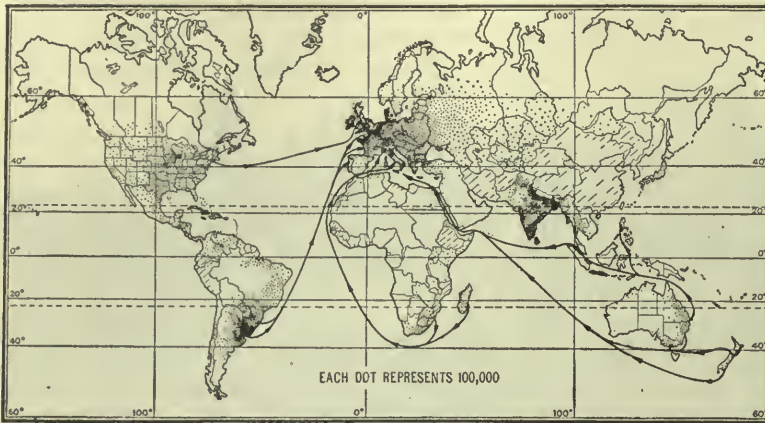


Fig. 345. A map showing the distribution of cattle. What countries import cattle products? export cattle products?

430. The coal trade.—Shiploads of grain, meat, butter, cheese, wood, cotton, wool, jute, skins, lumber, rubber, and other goods are paid for with cotton cloth, woollen cloth, knives, machinery, and other valuable manufactures. But these do not fill up one-tenth part of the ships that come in loaded with bulky raw materials. The rest of the space is not used unless it is filled with coal, so the shipowner who receives \$20 a ton for bringing wheat from Argentina is glad to accept \$4 a ton to carry coal back. For this reason England is the greatest coal exporter in the world, and sends millions of tons of this black necessity from Cardiff and Newcastle to Argentina, Brazil, France, and to all the countries of the Mediterranean, which unfortunately have very little coal.

431. A British harbor.—British waterfronts are busy places. The puffing tugboats labor to pull the big ships up to the solid stone walls of the docks. On the decks of the ships the rattling donkey engines wind and unwind drums, pulling ropes that lift bales and bundles from the hold to the wharf, lighter (Fig. 317), wagon, truck, or car alongside. Wagons, locomotives, and trucks wind in and out. Sailors of every color remind us of the ends of the earth.

432. A world trade center.—You can now begin to see how it is that England has built up a kind of trade called *entrepôt* (ahn-tray-po), which means the shipment of goods to one foreign country after importing them from

them all sorted out by sizes and kinds in London or Liverpool warehouses. If a Swiss or Norwegian cotton-spinner wants a few bales of Texas or Egyptian cotton, he can find it in the Liverpool cotton warehouses. Thousands of workmen in London or Liverpool are busy loading and unloading, sorting and grading, and storing goods that came from the ends of the earth and will go out again to the manufacturers and users in many countries. England is really a kind of middleman, like a storekeeper who keeps on hand the goods that come from a hundred different factories in a dozen foreign countries.

433. London, a center of world trade.—London is the greatest *entrepôt* in the world. In no other city do we see so many evidences of relations with all the world. The signs on the doors, the ships in the harbor, the great warehouses for storage purposes, the bundles on the docks, the people in the streets, and the news in the papers, all show that London is a great center of trade.

434. The carrying



Finch & Baker, U. S. Dept. Agr.
Fig. 346. Acreage of root forage (Sec. 442) in west Europe.

another foreign country. Thus, if a wool manufacturer in Philadelphia wants some Australian wool, he can find it in the London warehouses. If a rubber manufacturer in Nova Scotia or Ohio wants some Ceylon or African rubber of a particular kind, he can find it in the London warehouses. If a Boston or Philadelphia tanner wishes to examine goatskins from Mongolia, he can find

trade. — England owns so many steamship lines having agents in foreign countries, that it is easy for her to carry freight for other peoples. For example, an English line from London to Rio de Janeiro has an agent in Brazil. He may load a ship and start it off to New York, where another representative of the same firm may pay off the crew, unload the goods, and send the ship on her next voyage. Thus Britain carries the world's goods.

435. A travel center.—England's location has made her the greatest center of travel as well as the greatest center of trade. If an American wants to go quickly from Florida or Iowa to Scandinavia, he hastens to New York, takes a fast steamer to Liverpool or Southampton, and crosses England by train to London, Hull, or Newcastle, where he can get a small steamer to Norway, Denmark, or any Baltic port. By way of England he can go most quickly to Italy or to Russia.

436. Energy and the empire.—No other people have explored so many foreign countries; or climbed so many high mountains



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Fig. 348. Barley acreage of Europe and North Africa. This grain is used for human food and for stock feeding.

in South America, Asia, and other parts of the world; or hunted so many elephants in India or lions in Africa; or sent out so many men to run mines, ranches, and railroads in other countries. No other people has exported so many manufactured goods, or built up such a large empire.

437. Foreign investments.—As England has prospered in trade, and has her steamship agents in foreign ports and her salesmen in foreign countries, it is easy for her people to learn of business opportunities in foreign lands. Consequently Englishmen with money now own ranches in Australia and Texas, railroads in Argentina and Alabama, oil wells in Mexico, gold and diamond mines in Africa, and many kinds of property in many lands. Thus England has become a rich country, and she can pay for some of her imports with the earnings of her ships and with the profits from the property her citizens own in foreign lands.

With all this foreign business, London became the world's greatest banking center and the capital of the largest empire in the world. In addition to being a financial center and a trade center, she has also a great manufacturing industry. Her manufacturing industries are much like those of New York. (Sec. 341.)

438. Building the empire.—The British explorers, traders, settlers, shipowners, and investors in foreign countries have all helped to build up the empire. Sometimes British



Fig. 347. Plan of Letchworth (Garden City), England, the best-planned city in the world. One-third of it is to be city and two-thirds are to stay in playgrounds and parks and farms. S 10 means school with 10 acres playground. F 14 means football field with 14 acres. How many acres of playground have you? How far is it in Letchworth from factories to farms?



Fig. 349. Fishermen examining their nets at a fishing port on the east coast of England. In what sea do they fish?

Photo. Brown Bros., N. Y.

colonists have settled almost empty lands, as in Australia, New Zealand, and Canada. Sometimes the trader and the investor have gotten into difficulties with the natives, and the British Government has taken possession of the foreign country. Often England has made treaties with some native chief or king. After the treaty, the chief is usually left in power at home, but the British attend to all foreign affairs of the country, and usually take over more and more of the actual rule of the country. Such a country is sometimes called a British Protectorate. (Secs. 742, 705, 706.)

Sometimes adventurous Englishmen have gone out like the explorers of old and taken possession of land. One of these men, Stamford Raffles, was a naval officer in the East Indies. When he heard that a steamship had crossed the Atlantic, he sailed over and hoisted the British flag on the uninhabited island of Singapore (Sec. 706), at the very corner of Asia, and took possession of it in the name of the King of England, because he thought it would some day be a steamship center. He then wrote to the king

and told him about it. Raffles' prophecy was right. Singapore is to-day a great center of trade between Europe and Asia. In the central square of the city stands a statue of Sir Stamford Raffles, for the king made him a knight in return for having made a colony. Name the British ports on the way from England to Japan (Fig. 10).

439. Future.—The British people can extend their agriculture. They have been so busy at work in factories and building ships that they have used much

good land for sheep pasture, when with more labor it might yield great crops of grain, potatoes, and vegetables. Even if fully used, the land could scarcely feed the fifty million people who live in this little country that is not quite so large as New York, Pennsylvania, and Ohio. But so long as the coal lasts, the British factories can run, and, in times of peace, when the sea is free, the ships can come and go with food, raw material, and finished products. When the coal is all used, the climate will still remain. It is the most important thing of all. It helps make energetic men,



Fig. 350. Home of the British Parliament, whose laws influence more territory than the laws of any other governing body that ever existed. Can you name a continent or an ocean where its laws do not reach?

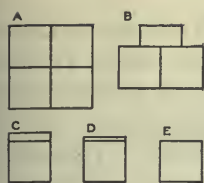


Fig. 351. Areas of the five largest nations and empires (1914):

Square miles

A. British Empire...	13,100,000
B. Russia.....	8,200,000
C. China.....	3,900,000
D. United States...	3,500,000
E. Brazil.....	3,200,000

How much of one of these squares would the area of the United Kingdom make?

and we may expect man's brains to find some other source of power to serve his needs. We may, therefore, expect this healthful, pleasant region to keep right on increasing in wealth and in population.

QUESTIONS

1. How does the character of the British coast aid trade? 2. Why have the British Isles developed a greater trade than Norway? 3. Give the latitude of the British Isles? of Labrador? Compare the climates. Account for the differences which exist. 4. Explain the fact that Ireland is called the Emerald Isle, and that Wales is a pasture land. 5. Why has England changed from a land of fishing and of farming to a land of factories? What problems have arisen as a result of factory life? Can you suggest possible ways to improve living in manufacturing towns? 6. Why is oatmeal a favorite dish for the Scotch? 7. Why is London a world center? Why should this enormous city be located in the southeast and not the southwest corner of England? 8. Give three reasons for the large *entrepôt* trade (Sec. 432) of Great Britain? 9. Name the foreign possessions (Fig. 10) of the United States. Compare their total size with that of the United States proper. Name some foreign possessions of Great Britain. Compare their total size with that of the British Isles. How can you account for the difference? Why does Great Britain need so many ships? Upon what country did the United States depend for carrying much of her freight and soldiers during the World War? Why?

10. Give reasons why England should be a rich nation. 11. How does the Manchester Canal help to lower the price of cotton goods? Follow on the map a ship carrying cotton goods from Manchester to New York; to San Francisco; to China; to India; to Egypt; to Algeria. Through what waters does it pass? What may that ship bring back to England?

12. Fill in the following chart:

MANUFACTURES OF GREAT BRITAIN.

CITY.	MANUFACTURED PRODUCTS.	SOURCE OF RAW MATERIAL.	SOURCE OF POWER.	COUNTRIES TO WHICH EXPORTED.

13. Why do the English think it strange for people to eat green corn, or "roasting ears"? 14. Why has the Delaware River been called the "Clyde of America"? Compare shipbuilding on the Clyde

Fig. 352. Area (sq. miles):

A. California...	158,297
Oregon.....	96,699
Washington.	69,127

324,123

B. Belgium....	11,373
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Where has the young man the better opportunity to advance himself?

River at Glasgow with that on the Delaware at Philadelphia. What advantages has the Delaware to-day over the Clyde? 15. Describe a shipping port (Fig. 317) in the British Isles.

16. Name two lakes of Scotland; two of England. What poet wrote about Windermere and Grasmere? 17. With what region in the British Isles are the King Arthur stories connected? Why did these legends grow up around this region?

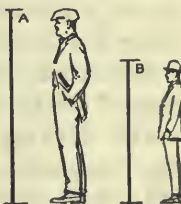
THE LOW COUNTRIES AND THE LOWER RHINE VALLEY

440. The region.—If you sail up the river Scheldt toward Antwerp, or up one of the mouths of the Rhine toward Rotterdam, you will look down on the fields and farms, for they are lower than the river, and all of the land is very flat indeed.

Why do the people who live here call their country the Netherlands, or the Low

Fig. 353. Population total:

A. Belgium (1918)....	7,555,576
B. California, Oregon, Washington (1920)	5,566,251



Country? Most of the land of Holland and a part of Belgium are just the delta of the river Rhine. This lower Rhine valley, together with the near by parts of France and Germany, which are almost as level as the delta, make up the greatest manufacturing



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Fig. 354. Europe's potato acreage. Why are so few potatoes grown in southern Europe?



Courtesy The Philadelphia Commercial Museum

Fig. 355. A field of hyacinths at Haarlem, near The Hague, Holland. Why do the Dutch grow hyacinths rather than wheat as the Dakotans do?

region on the mainland of Europe. This region is also more carefully farmed than any other European region.

What four countries own parts of this region? (Fig. 319.)

441. Making more land.—This region has few resources except location and good soil. Even land is scarce. But in Holland the thrifty Dutch not only use all that Nature has made, but by their own labor they have taken a quarter of their country from the sea. Because the sea waters near the Rhine delta are very shallow, the Dutch and Belgians have built dikes, thus cutting off areas of water. Then pumps, driven by windmills, pump the water out from behind the dikes. The sea bottom is then used for farms. But the windmills and engines must keep the pumps forever pumping, pumping, pumping, or the rain water would soon again turn the land into an arm of the sea. In the Zuyder Zee, a shallow bay in Holland, a large area is now being pumped out. Sea-bottom farms made of the rich mud from the Rhine Valley produce splendid pasture.

442. Intensive agriculture.—All of the land of this region is carefully used. Often the flagmen at the railroad crossings tend little gardens beside the tracks. Because

rabbits will eat weeds from the gardens, many people keep rabbits in hutches and use them for food. Even the dog works. German, Dutch, Belgian, and French milkcarts are pulled by big, strong work-dogs.

The farms are small, and the people must, therefore, put much work and much fertilizer on a little land, and thereby grow crops that yield much food per acre. A man in the United States can make more money growing a smaller yield per acre on a larger farm, with less work and less fertilizer.

The wheatfields of Belgium yield 38 bushels per acre, while those of the United States yield only about 15 bushels. In the United States the potato yields on the average 90 bushels per acre, but in Holland it is made to yield 290 bushels; in Belgium 300 bushels; in Germany 190 bushels. The climate is too cool for corn, but the plentiful rain and cool summer suit the potato perfectly. It is the greatest food crop of the region. (Fig. 354.) The sugar beet is another important crop, and



Photo. Wm. Thompson

Fig. 356. Catching shrimps on the Belgian shore.



Photo. Elmendorf.

© Ewing Galloway, N. Y.

Fig. 357. The Atlantic Ocean, the Dutch town of Helder, and the dike that keeps them apart. What has been done to keep storm waves from breaking the surface of this dike, and shore currents from washing it away?

forage beets are grown for animal food. (Fig. 346.)

To support a family, crops that are worth much money must be grown here on little land. In Holland one sees fields gay with the beautiful red, white, and yellow blossoms of tulips and other flowering bulbs. It costs \$2000 an acre to grow a crop of these precious bulbs, which are sent to bloom in America, England, and many foreign countries.

Where the moist lowlands are too wet to plow, they make rich pasture lands which support great herds of dairy cows. From the milk of the black and white Holstein cows, the Dutch farmers make very good cheese and butter which they send to Eng-



Courtesy U. S. Signal Corps

Fig. 358. A public square, the city hall, and houses at Audenarde, Belgium. In such squares in western Europe people hold great markets once a week or oftener.

land and even to the United States. The people who make expensive Dutch butter and cheese often sell it and buy cheaper cheese from Canada, and margarine made of coconut and peanut oil. Why?

443. The factory farmers.—The English people have let much of their land lie uncultivated, because they could make their living by manufacturing. But in the Low Countries across the channel there is not so much coal as in England, so the people there have improved their farming at the same time they were building up their manufacturing.

The governments of the four nations owning parts of the Low Countries have done a great deal to help and encourage farmers. In Germany the government conducts many more agricultural experiment stations than we have in any part of the United States that is the size of Germany. The Belgian Government sells tickets on the state railways at special low rates to encourage workmen in city factories to live in country villages where they can raise most of their own food on small farms and in gardens. In fact, the people who founded Garden City, England (Sec. 425), were trying to introduce into England the good method of using land and factories that had succeeded in Belgium.

444. A meeting place and a thoroughfare.—This lowland region is one of the great crossroads of world trade. Look at the map



Photo. Wm. Thompson

Fig. 359. A Belgian cottage. Of what is the roof made? (Fig. 9) and see how many countries send their ships through the English Channel to France, Spain, and the Mediterranean, and to North and South America. Do you see also (Fig. 319) that the Rhine Valley lies open from the North Sea, a great trade route through South Germany to the very base of the Alps in Switzerland? Thus the mouth of the Rhine is a crossroad of travel and a center of trade. Routes radiate from this center over both land and sea. We have seen another such gateway at the mouth of the Hudson. The Rhine Valley has been an important trade route for many centuries.

Because this region is a natural thoroughfare and easy of access, many wars have been fought here in the past, and many battles of the World War were fought in Belgium and in the north of France.

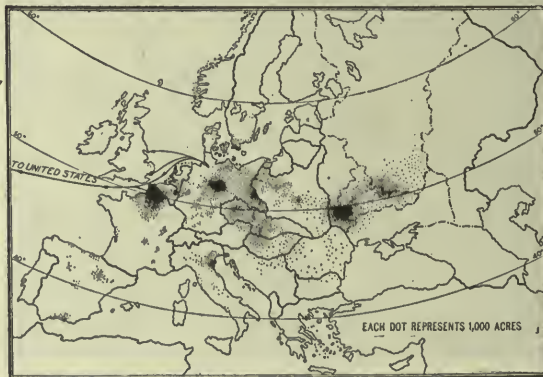
445. Harbors and waterways by hard labor.—By building deltas, the Rhine and other near by rivers have made much of the surface soil of the Low Countries. As the rivers fill up their beds, men must work to dig the mud from ship-channels and harbors. Big power-driven dredges take the mud from the channels and pile it along the river banks to make dikes. These mud dikes keep the rivers from overflowing the lowlands of Holland, Belgium, and Germany. All along the Rhine, from its mouth to Switzerland, an immense amount of work has been done to make the river a better waterway. Rocks

have been blasted out of the river bed, and wing dams have been built to make the water deeper. Much labor has been spent to straighten the course of the river in Germany below Cologne.

Improvements of harbors and waterways still go on. Antwerp and Rotterdam are turning big meadows into docks where ships may load and unload. A tunnel wide enough for six vehicles is being built under the river Scheldt at Antwerp, so that the city may grow on both sides of the river.

Large canals connect the River Rhine with Antwerp and nearly all the Dutch towns. Canals extend from Antwerp to Ghent, Bruges, and other Belgian cities, and to Paris and other cities of northern France. In fact, canals run in all directions across the lowlands of Holland and Belgium. No other part of the world, except China, has so many of them. In some districts they replace roads, and one may see a farmer hauling hay in a canal boat from his field to his barn.

446. A gateway region.—The harbors of Antwerp, Rotterdam, and Amsterdam are busy places. Like New York and the British ports, they are the gateways through which there flow streams of imports and streams of exports. Every day ocean steamers from other continents lie at the docks unloading goods into the long Rhine boats, or the short, stubby canal boats. As Belgium has a large colony in Central Africa (Fig. 531), Antwerp is the world market for ivory



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Fig. 360. The sugar beet areas of Europe. With intensive cultivation, these small areas gave Europe an export of sugar. Name one customer for this sugar.



Fig. 361. A map showing the distribution of swine in Europe. How does the American Corn Belt farmer help the European farmer to raise good fat porkers?

and other African goods. Four hundred years ago (Sec. 420) Antwerp was a greater *entrepôt* (Sec. 432) than London, and she still has a large *entrepôt* trade. Rotterdam (Fig. 362), the chief port of Holland, is a market for tobacco, coffee, cinchona bark, cinnamon, sugar, and other products from the Dutch East Indies. The heaviest trade of these ports is in grain and other foods, cotton, lumber, and other raw materials from the United States, South America, and all those countries that help to feed the millions of factory workers of Holland, Belgium, western Germany, Switzerland, and northern France. A wide region trades through these ports; goods from everywhere are assembled here. Much of the merchandise is carried by the Rhine boats, which go as far as Switzerland, and bring down the bales and boxes from hundreds of factories.

Many lines of British steamers call at Antwerp and Rotterdam, and help the Dutch, Belgian, and German lines carry the exports of this region to almost as many places as those to which Great Britain sends her exports.

Besides exporting manufactures, Belgium, like England, sells coal. Thousands of tons of it go each month to Holland, France, Switzerland, Argentina, and even to Rumania.

447. Reasons for growth of manufacturing industries.—Four advantages fit this region for manufacturing: (1) Good, healthful climate, much like that of England (Sec.

416). (2) The coal field that stretches across northern France, Belgium, and into the Rhine Valley of Germany. (3) The much-used Rhine River and its valley. (4) Splendid agriculture.

It is a great advantage to a manufacturing region when food for the workers is produced near the factory districts. (Sec. 443.)

Because of these four advantages, the Low Countries became a great manufacturing region when England was still a farming country. Three hundred years ago there was much more machinery in the Low Countries than there was in England, for in the Low Countries, in addition to hand machines, windmills were used to grind grain and pump water.

448. Manufacturing and cities.—Across the neat fields of Holland and Belgium, one often sees the high smokestacks of some manufacturing town in the distance. From the deck of a steamboat on the Rhine, one may see a kind of procession of smokestacks as the boat passes town after town and city after city.



Fig. 362. Ships and boats beside a quay at Rotterdam. Where may these boats go? What will they carry?

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© Keystone View Co., N. Y.

Fig. 363. Terraced vineyards held up by stone walls, near Coblenz, Germany. Are they on the north or south bank of the winding River Rhine?

The factories, like those of England, import many of their raw materials. Iron ore from the French province of Lorraine is carried by boat and train to supply the manufacturing districts of France, Belgium, and the lower Rhine. These rich ore fields are near this region but not in it.

The greatest iron production of this district (the Pittsburgh of the continent) is near Cologne, at Essen and neighboring towns. These cities are on or near the Ruhr, a navigable branch of the Rhine. Thus boats can come close to the great factories. The famous Krupp gun works, one of the world's greatest manufacturing plants, is at Essen. Since the World War this factory makes locomotives and many other kinds of machinery. This region with its steel industry resembles Pennsylvania. It also resembles New England, because there are many textile factories at Cologne and other Rhine cities. In Belgium, the cities of Ghent and Brussels are textile centers, while Lille in the north of France is famous for woollens and cottons.

One coal field lies under three of the countries in this region. Reaching from Lille, France, to the Rhine, it feeds many factories that make iron, cement, and glass. Belgium is one of

Fig. 364. Population per sq. mi.:

A. Netherlands (1918).....	539
B. Denmark (1916).....	180
C. Iowa (1920).....	43.2

Compare these figures with Fig. 365.

the great glass manufacturing countries of Europe. Much of the glass, cement, and iron are exported.

The chief manufacturing cities of Belgium are Ghent, Liege, and Brussels. Brussels and Cologne are the largest cities of the region. Both are larger than San Francisco. Like Amsterdam, Rotterdam, and many smaller towns, they are neat, well-kept cities, with many beautiful buildings, some of them several hundred years

old. One such is the Cathedral of Cologne.

449. Intensive manufacturing.—The women, especially the Belgian women who live on the farms, often make lace by hand. A few cents' worth of thread is turned, by much labor, into dollars' worth of beautiful handmade lace. (Fig. 369.)

Holland is so poor in raw materials that she has to buy even stone and logs from Norway and Switzerland, with which to build the dikes that keep the sea from overflowing her land. Nevertheless, her people are such skilful and industrious workers that the little country has prospered.

Amsterdam is the great center of the world's diamond trade. It has a diamond exchange with hundreds of members. Diamonds are bought and sold every day. In their shops near by, skilled diamond-cutters change the rough-looking pebbles that come from Africa into flashing jewels, which are sent to every part of the world.

450. People and government.—Four different peoples, speaking four different languages, living in four different countries, inhabit this one small district. The German and Dutch languages and peoples are somewhat alike. The Flemings—the people of Flanders, a part of Belgium—resemble the Dutch. French is

Fig. 365. Population per sq. mi.:

A. Belgium (1910).....	652
B. United States (1920).....	35

What does this mean for the people?

the language of Brussels, and the official language of Belgium. Because these four peoples live so close together, well-educated people speak more than one language. Most traders of Holland or Belgium doing business with the people of other countries speak German, English, and French.

The people of this whole region are industrious, thrifty, and saving. Their houses, gardens, and villages are neat; and the fields are free from weeds. In many sections of Holland and Belgium the people still wear native costumes of ancient and picturesque styles.

Holland and Belgium are each about the size of Massachusetts and Connecticut combined. In the two countries there are 14,000,000 people, a number twice as large as all the population of New England. If we should add the population of the German and French parts of this small region, there would be as many people as in all the territory of the United States west of the Missouri and the lower Mississippi rivers.

Holland and Belgium are small countries, but their people are very patriotic. The Dutch love their queen, and the Belgians love their king very much, although as a matter of fact the people really rule themselves, through their parliaments, which pass all the laws, and even give the king and queen the money they spend. Both Holland and Belgium have colonies many times as large as the mother country, and with more people than the mother country. Name them. (Fig. 10.)

451. Future.—England farms so little of its land that it can increase

Fig. 367. The number of cattle and horses per square mile (1912-13):

A. Netherlands	199
B. Denmark	150
C. Iowa	102

Does this mean that Denmark is a better country for farm animals than Iowa?



Fig. 366. Interior of the Krupp Gun Works, Essen, Germany, taken before the World War. It now makes machinery. Give two good reasons for the location of this factory in the lower Rhine Valley.

Photo. Brown Bros., N. Y.

its food production, but the Low Countries and the Lower Rhine Valley use their land so fully that there can not be much increase in food production. The population, however, has long been steadily increasing because of the growth of cities and trade. The people here, like those in the United Kingdom and in New England, buy much of the food they eat, and also have raw materials brought from distant lands. (Sec. 446.) As long as this great trade continues, the number of cities that can grow up in the manufacturing places is almost without limit.

QUESTIONS

1. On a trip from London through the Low Countries, what cities would you select to visit? Describe the scenes as you go from city to city; the land, the houses, the people, and the industries along the route. Questions to ask yourself as you go along: Why has Holland been able to depend upon the wind to run her mills? There are two geographical reasons. Why is Holland engaged in the dairy industry rather than the meat industry? What business factor makes bulb raising a profitable occupation in this region? What is an important reason for visiting the following places: Leyden, Delft, The Hague, Amsterdam, Brussels, Antwerp, Liege? What would you buy as

Fig. 368. Bushels of grain per person (1911-13):

A. United States	50.8
B. Canada	47.7
C. Belgium	11.5

What can you say about the amount per acre in Belgium and in the United States and the United Kingdom? (Fig. 331.)

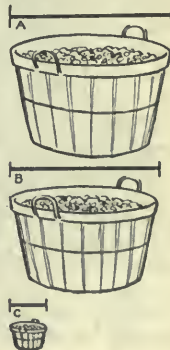




Photo. Ewing Galloway, N. Y.

Fig. 369. Lace-making in a Brussels back yard. Why is lace-making important in Belgium? What kind of shoes does the old man wear?

souvenirs of this region? 2. Trace the journey of a diamond from its start at Kimberley, South Africa, to your nearest jewelry store. 3. As you study this chapter, answer these two questions about the Low Countries and Lower Rhine Valley: (a) How its geographic position and surface make it a great trade center. (b) What influences make it the greatest manufacturing section on the mainland of Europe? Write the answers only after careful study. 4. If possible, find out about the new library which American citizens are building in Louvain to take the place of the one destroyed by the Germans in the World War.

5. Describe the method by which land is reclaimed in Holland. Compare it with the methods used along the Mississippi River. 6. Do you think that a worker in a mill or a factory would be any better worker because he was also a farmer and owned his own farm? Why? 7. Compare the life of a Dutch boy or girl with your own. 8. Take a trip from Rotterdam to Coblenz. Describe scenes along the journey. (Fig. 363.) At which cities would you want to stop? Why? How is Rotterdam a gateway similar to New York? For how many countries is the Rhine a great highway of trade and travel? 9. Choose one of the following pieces of work: Build a small Dutch windmill that will run, showing place for machinery, storeroom, living apartments. Construct a dike on the playground. Dress dolls in Dutch costumes. Write a story about one of the following: Hans of the Windmill; Jan, the Boatman's Boy; Gretchen, the Goose Girl. 10. What are some of the sports which the people are able to enjoy in winter? Describe one of these.

11. Describe a scene at the mouth of the Rhine (Fig. 362), naming the flags of all the countries you might see. Look up the flags in the dictionary. 12. Examine the physical map of Europe. Can you tell why the Germans took the route through Belgium instead of crossing directly over their own border? 13. Why did both sides watch Holland so closely during the World War? Why was Germany so anx-

ious to get control of Antwerp during the World War? 14. Fill out the chart:

CITY.	COUNTRY.	NOTED FOR.
Essen.....		
The Hague....		
Ghent.....		
Brussels.....		
Lille.....		

15. How is it that ivory and rubber from the tropics are marketed in Antwerp? Account for coffee and spices in Rotterdam. 16. What are the chief imports brought into the Rhine Valley? From what countries are they brought?

THE ATLANTIC PLAIN OF FRANCE

452. An agricultural nation.—France is made up of parts of six of the regions of Europe. What are they? (Fig. 319.) The most important part is the great low plain that slopes west and northwest toward the sea. The climate is good, like that of England, but somewhat warmer because it is farther south. It is an agricultural region in which there are a few cities. The region does not have as many manufactures as does England, partly because it has so little coal. Instead of building factories and big cities, this region has remained a land of farms, supporting itself chiefly from its own fields rather than by buying food from other countries, as England and the Low Countries do.

453. The farmers on the plain.—In France, each peasant farmer owns his few acres, instead of renting them as English farmers do. The Frenchman loves his little farm and will not leave it. This kind of ownership of land has helped to make France an agricultural country.

The farmers live in villages of ten to fifty houses, and go out each day to their farms near by. One sees a patchwork of little fields with crops of various colors—wheat, hay, potatoes, beets for the cattle to eat, or beets to go to the sugar factory. It is warm enough for a little corn to be grown in the southern part of the Atlantic Plain.

Many of the farmers in this part of France have herds of cows and send butter to England. The French farmers here raise a breed of splendid, big, strong horses, called Perche-



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Fig. 370. European grape districts. Name the two chief wine districts. Give a reason for their locations.

ron, which may be seen on almost every farm, and also in the United States (Fig. 5).

There are important wine districts in the Atlantic Plain. The largest is near Bordeaux, and a second is in the upper part of the Seine Valley, near the beautiful city of Rheims. Figure 375 shows how the French farmers live in villages and go out each day to work in the neighboring fields.

454. **Brittany and Normandy.**—The western peninsula of France is called Brittany. It is rather hilly and damp, like Wales, and like Wales has many sheep and cattle pasturing upon it. The people who live on the coast are fishermen. They catch sardines off the shore, and sometimes sail to Newfoundland to catch cod.

Normandy, the famous province in the peninsula east of Brittany, is one of the sections of France where fruit is grown. Apples from Normandy are sent to Paris and London markets.

455. **French thrift.**—The French are thrifty people. We see this in the fact that nearly every French person, man, woman, boy, or girl, saves some money. No matter how much or little he or she may happen to have, a part is saved. Then when money is needed there is some in the bank.

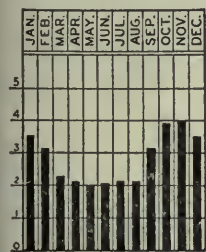


Fig. 371. Rainfall of Brest, France, 32.5 inches per year. In autumn the ocean is much warmer than the land. Why does this make heavy autumn rainfall?

The French are noted for their good cooking and for their skill in making good dishes out of things which we Americans often

throw away. In America, vegetables go to market in barrels and boxes made of boards sawed from the trunks of trees, a process by which much wood is wasted. As soon as the American box or barrel is emptied it is usually thrown away or broken up. In France, food goes to market in big baskets woven by hand from the long, limber branches of willow trees which are grown for that purpose along roadways and stream banks. When a crop of twigs is cut off, another grows again in a year or two, so that one tree will give many crops of willow twigs and will furnish many baskets, most of which are used over and over again, instead of being thrown away.

The French farms are well tilled, and the farmers often get two crops from the same land by planting English walnut trees in the midst of their fields. The fine nuts obtained from one of these trees causes the tree to increase the value of the farm as much as another acre of land would do; so the income of a farm is often doubled by a few trees.



Photo. Wm. H. Rau, Inc.

Fig. 372. One of the glories of France, the Cathedral at Rheims, as it appeared before the World War.



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Fig. 373. Peasant men and women threshing wheat in Brittany. Horse-power machine near stack.

Along the southern part of the east coast of the Bay of Biscay stretches a hundred and fifty miles of sand. For a long time the west wind blew it into dunes which traveled inland, and buried the forests. The French laboriously planted pine trees on the dunes; this stopped the dunes from moving, and now the trees have grown into forests. They are bled to death to make turpentine, and the small trunks are sent to England, and used to prop up the roofs in coal mines. By cutting a small part of his trees each year, the forest owner has a regular business. How have we done it in the United States? (Secs. 121, 333.)

456. French art and Paris.—The French are an artistic and gifted people. They love to make and to have beautiful things. Nearly every city of France has a public square in the center, and usually a great church or cathedral. The people of the cities of France are very proud of their beautiful cathedrals and of the masterpieces of painting and sculpture with which they are adorned. These buildings, like the cathedrals of other European countries, have

often been the work of many generations. When times were peaceful and prosperous, the masons, the stone cutters, and the sculptors worked to build another part of the great building. (Fig. 372.) Sometimes work was interrupted for five years, or fifty years, or a hundred years. It is hard for people born in America to understand how people can love buildings as much as the people of France love their cathedrals.

Wonderful collections of pictures and statues are to be seen in France. French builders, with their love of the beautiful, have made Paris, the French capital, one of the most beautiful cities in the world, a city to which travelers go each year by hundreds of thousands. The Louvre, in Paris, is one of the world's most famous art galleries. Some of the pictures and statues have been brought from other countries. Hundreds of people from many foreign countries are in Paris all the time studying to be painters and sculptors.

We see French art in the trade of Paris. As Manchester means cotton, and Birmingham means iron and steel, so Paris means artistic and beautiful clothing and furnishings. Gloves, dresses, hats, perfumery, and jewelry are made in Paris in great



Courtesy U. S. Air Service

Fig. 374. Place de la Concorde, one of the beautiful public squares of Paris. What river do we see?

quantity, and sent to the United States, South America, and many foreign countries.

Paris lies in the center of a rich plain in the northern part of the Atlantic Plain. It is five times as large as Marseille, the second city of France, and is one of the greatest railroad centers in Europe. Every day trains enter from Portugal, Spain, Switzerland, Italy, Germany, Holland, and Belgium, and from the channel ports to which people come from London.



Photo. "The World's Agriculture"

Fig. 375. Farm village surrounded by tiny unfenced fields, in the Atlantic Plain of France. Who owns the fields? Why are they of different colors?

The city of Limoges is almost as famous in pottery as Paris is in clothing. Haviland china, made in France, is widely known.

Rheims, in the midst of limestone hills where sheep are pastured on land too rough for farming, is a wool-manufacturing center.

457. Trade.—The chief ports of this district are Bordeaux, the port of the west, exporter of wine, and Havre, port of the north, through which most of the trade of Paris goes. Havre is especially famous as a market for Brazilian coffee and American cotton. A ship from Galveston once unloaded at Havre 28,000 bales of cotton of 500 pounds each. What would that be worth now? River boats go up the Seine from Havre to Paris. There are canals to Antwerp and the coal fields of the north near Lille, as well as to the rivers Rhone and Loire. Altogether, this plain is well equipped for trade. It is all near to the sea; it has several seaports, several navigable rivers, and a good system of canals connecting the rivers.

There is a lively traffic between Paris and London. By the fastest trains, one can make the journey in less than eight hours. Of this time, a little more than one hour is spent in the twenty-mile boat-ride from Calais to Dover. Other routes of travel between London and Paris are by way of

the channel ports of Boulogne and Dieppe, and by airplanes, which now maintain a regular service between the two capitals.

St. Nazaire and Brest are two smaller ports in the west. Hundreds of thousands of American soldiers were landed at Brest during the World War.

458. Government and colonies.—France is a republic with a congress (or parliament) much like the American Congress, and a president, who has much less power than the President of the United States. France does many things in Paris which we do in our county seats, city halls, or state capitals. For this reason we say that the French government is very much centralized. This custom brings many people to Paris and helps to make it the largest city on the continent of Europe. Compare it with some American cities in population.

We have already seen that France owns some small colonies in America (Sec. 254), but she has very large colonies across the Mediterranean and in northern Africa. She owns most of the African shore opposite France and Spain, most of the Sahara, and some land south of the Sahara. French possessions in Central Africa extend even to the equator and beyond it. France also has some colonies in southeastern Asia. Name



Fig. 376. Old fortress on the waterfront at Brest, France. Would it be effective nowadays? Explain. Find a drawbridge and a tiny artificial harbor.

Courtesy U. S. Air Service

the French possessions (Fig. 10). Among all the large French possessions, only Africa north of the Sahara is suitable for white men. In the others the people are nearly all black or brown, and even in North Africa there are six Arabs to one white settler.

459. Future.—While the Atlantic Plain of France has almost the same good climate that England has, it does not promise to become a land of factory towns, such as England is. English coal, which is used there, must cost more in France than it does in England.

More food can be produced because French agriculture is not so intensive as that of Holland, Belgium, or Germany. France might also produce more manufactures, for Holland has shown that a country with few raw materials and little fuel can manufacture extensively, but the fact seems to be that France is not increasing in population and that her industries show but little change. Since the World War, there have been many plans for improvements in industry. One of these plans is to build large water-power plants which shall be run by tidal water caught by dams across arms of the sea. Another is to build a canal from Paris to the coal and iron-ore district of Lorraine near Luxembourg. (Sec. 518.) This plan would give France a chance to get iron and steel at

less cost, and in this way build up her manufactures. If manufactures increase, it will be by making light, fine things, which employ the artistic and skilful work of the people, and which do not require heavy raw materials or much fuel. Why?

QUESTIONS

1. Name eight foreign countries from which trains enter Paris daily. What languages must the Bureau of Information official know? 2. A trip from London to Paris, via Dover and Calais: What is the shortest distance across the channel? How long does it take to cross in a boat? in an airplane? As you leave the

English shore look at the Dover cliffs of chalk, a very soft white rock. Explain their formation. (Sec. 21.) Compare the scenes as you go through the country from Calais to Paris with those of the Low Countries as to windmills; canals; crops; smokestacks. How long does it take from London to Paris by rail? How long by airplane? 3. Locate the Seine, Loire, and Garonne rivers. What does their direction tell us about the slope of this region? 4. Which coast of the United States does the coast of France resemble? 5. Sum up the agricultural advantages of western France under the following headings:

CLIMATE.	SOIL.	SURFACE.	METHODS OF AGRICULTURE.

6. Sketch an outline map of France. Mark off the Atlantic Plain Region. Indicate the important rivers, the chief cities, a region producing wine; sheep; apples; pine lumber and turpentine; pottery; cotton manufactures.

7. How would the climate of this region be affected if the Pyrenees extended north along the shores of the Bay of Biscay? What great harbor would lose its importance? 8. Write an essay on some lessons in thrift learned from the French. 9. Why is it that Great Britain, with resources for agriculture as good as those of the Atlantic Plain of France, does not feed herself, as does France? 10. Sum up France's advantages for trade under the following headings:

RAW MATERIALS.	TRANSPORTATION FACILITIES.	MANUFACTURED ARTICLES.	COAST LINE.

11. Name the French colonies. (Use the world map.) How do they compare with England's? What new foreign possessions did France acquire by the World War? 12. Prepare an exhibit in your school room of

French pictures, maps, products. If you have a good library in the school, or in the town, try to borrow some books which will show pictures of the most famous French cathedrals; of Joan of Arc's birthplace; of the historic columns and statuary in Paris; of the small villages in which the farmers live; of one of the old castles, and of one of the walled towns. 13. How many French things have you seen? Trace each one back to France, and see how it is particularly connected with the kind of country France is, or with the French people.

THE GREAT PLAIN OF CENTRAL AND EASTERN EUROPE

460. Appearance.—Europe is the only continent that has a low; level plain stretching entirely across it from west to east. One can cross this plain by train from Amsterdam to Berlin, Warsaw, and Moscow. The rail-

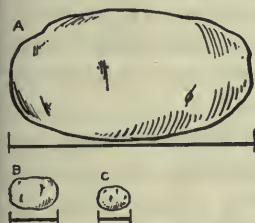


Fig. 377. Potato production in bushels (1912-13):

A. Germany	1,916,727,000
B. United States	376,086,000
C. United Kingdom	248,847,500

The lover of hills and mountains does not like this plain. Wherever one looks all is flat—everywhere flat, level land. Here and there are villages, sheltered by shade-trees, then miles of flat, fenceless fields reaching away to the next village, and the next, and the next. For hundreds and even thousands of miles one sees nothing that stands higher than the church spires. This monotonous scene is varied only by an occasional forest, or a marsh at some place where the land is so very flat that the water will not drain away after rains.

The plain is fenceless because the land is rarely pastured. Why? (Sec. 462.) Where animals are pastured, some one watches them to keep them away from the crops.

461. Ease of travel.—It is easy to travel and to trade in a region like this. It is easy

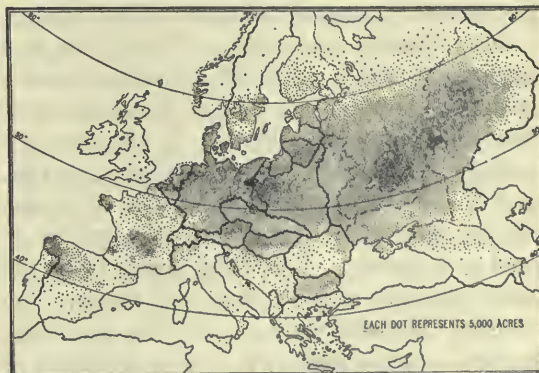
road crosses the Volga River at Samara, and the Ural River at Orenburg. So vast is the extent of this plain that one could journey 1000 miles farther to Tashkend in Asia, and still not cross a mountain. What regions does this Plain of Central and Eastern Europe touch? What countries lie wholly or partly within it?



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Fig. 378. Europe's acreage of oats, another grain of the Northland. What do nitrate and phosphate rock have to do with grain crops? (Secs. 30, 859.)

for railroads to cross level land, and where the land is level, boats can go on the rivers. The arms of the sea also help. What fraction of the way across Europe can ocean steamers sail in going to Petrograd; to the eastern end of the Mediterranean; to the eastern end of the Black Sea? Both of these far-reaching arms of the sea touch the Central Plain and receive navigable rivers that come from its very center. Navigable rivers also provide waterways all the way across the western part of the plain from the central highlands to the North and Baltic seas. The greatest river of all Europe, the muddy Volga, the Mississippi of Europe, enables steamers to travel for hundreds of miles across central Russia and on to the Caspian Sea where they touch the shores of interior Asia. The land near



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Fig. 379. Europe's rye acreage. Compare this with Figs. 378 and 321, and tell why rye is called a crop of the Northland.



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Fig. 380. A Russian carriage on a public square in front of a Russian church. Some of the Russian people are very artistic.

the sources of these streams is so level that canals have been built to connect the Baltic rivers with the Volga, and with those flowing to the Black Sea.

The snows of winter give one more aid to travel. The sled, or sleigh, is easier to draw than a wagon, and it has been used for centuries in this region for most of the heavy hauling from farm to town or river bank. In few other regions in the entire world are the natural means of transportation so easy.

462. Climate and crops.—This plain is a land of the north. The climate of its western part is somewhat like that of England, or of western Washington State. In the center it is like the climate of our own Lake District, and in the east it is like that of our Northern Wheat Region. Everywhere the winter is cold and snowy. Eastward, away from the mild climate of the Atlantic Ocean, the winters become colder, and the summers hotter. (Figs. 328, 329.) The streams of Holland are frozen for only a short time each winter. Those of eastern Germany are frozen for a month longer, and those of

eastern Russia for a month longer than those of Germany. The rainfall also becomes less as we go east. The western boundary of Holland has $27\frac{1}{2}$ inches of rain, Berlin has 23, and Orenburg, on the Ural, has only 14 inches a year. Compare this with the rainfall of our Northern Wheat Region (Fig. 158).

The crops show that it is a land of the north. Rye, oats, beets, and the potato are especially important in the northwestern part of the plain, where the climate is cool and damp. The potato is to the Germans, Danes, and Swedes what corn is to the people of Iowa and Kansas.

In the drier southeast enough summer rain falls for spring wheat (Sec. 89) and barley, which are here the main crops. In the lower Volga Basin the rainfall is uncertain; some years the crops are good and sometimes they fail, causing famine.

Near the Caspian Sea there is not enough rain for wheat; so this locality, like our own Great Plains, is a region where herdsmen tend their flocks. (Sec. 102.)

463. History and peoples.—This plain, so level from end to end, and blessed with enough rainfall to make crops or pastures, was a place where ancient tribes wandered with flocks and herds and made an easy living. At the time when Greece and Rome were great nations, this whole plain was occupied by roving bands of savages who fought for possession of the land, much as the Indians did in America. On this account, the level plain is to this day the home of many different peoples who occupy the land that their ancestors managed to hold in the ancient struggles for home space. Let us see who these peoples are and how they live.

464. The Scandinavians.—The northwestern part of the region is the home of the Scandinavian peoples—the Norwegians, Swedes, and Danes. The peoples of these three countries resemble one another in several ways. They are usually large, tall, blonde people. These peoples are alike in being well-educated and in having given to the world many explorers, scientists, and learned men. It is easy for these three

peoples to understand one another's language.

What parts of the Scandinavian countries are included in the plain? (Fig. 319.)

The Scandinavian lowlands are much alike in industries, which are chiefly agricultural, with a few manufacturing cities.

465. Denmark is a coastal plain, mostly sandy and much like Long Island, or the southern part of New Jersey. Most of the soil is poor, and the climate is damp and cool. It is not a place in which to make an easy living, but by hard work the Danes have made their country prosperous and full of pleasant neighborhoods in which people like to live. These people have

shown the world how to practice coöperation in agriculture. If you buy an egg from Denmark, you will see a number printed on its shell. The number shows which member of the Danish Coöperative Association sent the egg to market. If it is a bad egg, the man who sold it must pay a fine. If he should sell a second bad egg, he must pay a bigger fine. For a third bad egg, he will be expelled from the egg association, and then, because he can no longer sell through the association, he must take a lower price for his eggs. In the same way the Danish dairy farmers have joined together. They jointly own factories where excellent butter is made. Often it is put into tin cans, and sent to places as far away as Central America, Africa, or even Alaska. The Danish farmers raise many hogs, which are prepared for market in coöperative packing plants.

In a short time Denmark has risen from a poor country to a very prosperous one, largely through the industry of her people, who make their butter, eggs, and bacon so good that other countries want them, especially England. Sometimes Danish butter is exported to the United States.



Photo. Williams, Brown & Earle

Fig. 381. View of Stockholm and a part of its harbor. Locate Stockholm.

Denmark has good country roads and very good country schools.

466. Southern Sweden and southern Norway.—Nearly all the farmers of Sweden who live in this plain have followed the example of their neighbors across the straits in Denmark, and are producing good butter. The Swedes, Danes, and Norwegians import much feed for cows, because they find it profitable to keep many cows. They buy cottonseed meal and corn from the United States. Their own lands produce barley, oats, hay, and beets for the cows. There is not room for much wheat. That is imported; but many potatoes and vegetables are grown.

The glaciers once covered all of Scandinavia, and made even the lowland of Norway and Sweden a land of stones, marshes, and lakes, resembling parts of New England. So small a part of the land has been left fit for farms that Norway has very little farmland indeed. She pays for most of her imported food with lumber, paper, and fish. (Sec. 413.)

In Sweden, dairy machinery is manufactured, and other fine machinery, much of which is exported in steamships of the Danish companies which sail from Copenhagen,



Fig. 382. The German branch of the General Electric Company, an American corporation. (Fig. 283.)

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and call at Goteborg, Sweden, en route to all the leading countries of Europe, North and South America, and Asia. Some Swedish factories make steel products, such as watch springs and delicate machinery, that are worth more than their weight in gold. Electric power from the Scandinavian mountains (Sec. 509) may help the lowland cities of these three countries.

The Scandinavian capitals are clean, well-kept cities, with some manufacturing. Compare them in size with Washington; with Montreal. In each Scandinavian capital is a king, who has but little power, and a parliament which is elected by the people to rule the country.

467. The German part of the plain.—About half the people of Germany live in the German part of the Central Plain. Where is the capital of Germany? The Germans are a well-educated people, and they have applied their knowledge to agriculture, manufacture, and trade, as well as to war.

The German land is well

used. Much of the German plain was originally poor, sandy, and often swampy; but by the application of skill, fertilizer, and hard work it has been made to produce large crops of rye, potatoes, barley, and oats. These are the crops that both men and cattle eat, and before the World War there were more cattle and hogs on this plain than in any area of the same size in the United States. (Fig. 361.) Some wheat is also grown. The people eat some wheat bread, but much more rye bread (Figs.

321, 379). The German people eat more potatoes, and therefore less of some other things, than we do. Potatoes are much used to make flour and alcohol, and as food for pigs and cows.

468. German education.—Wishing to make Germany a manufacturing nation, the government has done much to help education. German universities were among the first in the world in teaching chemistry and physics, so that there have been many trained chemists, machinists, and engineers to go into fac-



Photo. Wm. Thompson

Fig. 383. Some of the buildings at the University of Berlin. What subjects helpful to industry were German universities among the first to teach?

tories. Thus Germany became the leading nation of the world for the manufacture of chemical dyes, and for many other articles requiring knowledge, skill, and patience.

Germans have written many scientific books, and some of the world's most famous music was composed by German musicians.

469. German manufacture.—Coal is found near the southern edge of the German Plain near Leipzig in the state of Saxony, and also farther to the southeast in Silesia, near the Polish

boundary. (Fig. 385.) Here at the southern edge of the plain is one of the most densely peopled parts of Europe. Ancient towns such as Muenster, Hanover, Leipzig, Dresden, and Breslau have long been trading centers, because, like Denver, they stood as gateways to the highlands. Now that coal drives the machinery, these ancient towns have grown to be large manufacturing cities. Leipzig is one of the great book manufacturing cities of the world. The beautiful city of Dresden, capital of the Kingdom of Saxony, is famous for its manufacture of chinaware and porcelain. Not far away are Chemnitz, with many textile industries, and Breslau, with iron manufactures.

470. Berlin.—Germany is now a republic, but it was an empire before the World War. Berlin towers over all the cities of Germany, as Paris and London tower over the other cities of their countries.

Berlin is a great center for canals and railroads, and it has many factories. It has a famous university and a famous opera house. Many foreign singers have gone to Berlin for study. Many of the streets are wide and ornamented with statues. The Zoo is one of the finest in the world. As in all capitals, many people in Berlin are kept busy in



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Fig. 384. Cranes for heavy freight and putting machinery into unfinished ships, Hamburg, Germany. This harbor has a very large basin, in which many ocean liners may anchor before and after loading or unloading their cargoes.

the offices of the government. Between 1880 and 1910 the city grew almost as fast as Chicago. As in New York, most of the people live in apartments, several families sometimes living on one floor. Many families have only one room. There are no yards around the houses, but many public playgrounds are provided for children.

471. German trade.—The Germans have studied the needs of other peoples carefully, and have worked hard to build up a foreign trade by exporting manufactured goods, so that they could pay for food and raw materials. Before the World War, lines of steamers went from Hamburg and Bremen to every continent and to most of the countries and great ports of the world. Many of these steamers stopped at Rotterdam and Antwerp to gather up Dutch, Belgian, and German goods from the Rhine district. Splendid harbors have been dug in the meadows beside the Elbe at Hamburg, and beside the Oder at Bremen.

The Kiel Canal was cut to make a quicker outlet from the Baltic to the North Sea. The rivers were deepened, so that boats might cross the German plain from the North Sea to the southern highlands. A great east and west canal was dug so that grain might come from the farms of east



Fig. 385.

Germany to Berlin and Hamburg. We have already seen (Sec. 445) how the Germans have improved the River Rhine. Germany is rebuilding her foreign trade.

472. The Poles, Letts, Lithuanians and Esthonians.

—The peoples of these new nations (Fig. 385) are not so well-educated as the Germans and the Scandinavians. The Poles once had a kingdom of their own, but about the time of our Revolutionary War it was

divided up between the empires of Russia and Austria, and the big German state of Prussia. For more than a hundred years the Poles have been a people without a country, and have been oppressed by their rulers. They have not had many good schools, although many Poles are well-educated, and some of them have become very famous. During all these generations of oppression they have kept alive the Polish spirit and the hope of being independent. Since the World War they have ruled their own country once more.

The countries of the Letts (Latvia), the Lithuanians, and the Esthonians are three small, new countries. They were under the oppressive rule of Russia until their independence was restored by the conference at the end of the World War.

Poland and the new Baltic States are chiefly agricultural (Sec. 462); but they have not grown such good crops as the Germans have, because their farmers have not had education or government aid, as have the German farmers (Sec. 443).

473. The government of Russia.—The Russian people have had less opportunity than the Poles. For several hundred years Russia has been ruled by emperors, or czars, as they were called, and by a few of the czar's friends. This small group of rulers cared little about the welfare of the people. They



Fig. 386. Russian stone polishers. How is the power furnished in this small factory? In the German factory? (Fig. 382.)

stole most of the tax money, and squandered it in Petrograd and in foreign lands. They thought they could have their own way more easily if the people were ignorant. For this reason there were few schools, and about nine-tenths of the Russian people cannot read or write.

During the World War the Russians drove out the Czar, and there was much fighting among the Russians themselves to see who should rule. During this time Russia had little trade and the people suffered much. Many of them starved or died of sickness.

Before the World War many of the peasants rented their farms from rich landlords who took too much rent. One of the results of the Russian revolution was to give land to the peasants who before had worked it, but had not owned it.

If we compare Denmark with Russia, we can see what a good thing it is for a country to have a good government and what a bad thing it is for a country to have a bad government. The Danish village is well governed. It is neat and tidy, with good schools and educated people who live in clean, painted houses. The Russian village is poorly governed and often has no school. Many of the houses have dirt floors and straw roofs; most of them are unpainted, and often they are not clean. The roads are fearful mud-



Fig. 387. Polish women plowing. Does this look like efficient labor?

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holes, and the crops do not yield half as much per acre as crops do in Denmark, because the people have not been taught agriculture as have the Danish people. The contrast between these two countries makes it clear that everyone should do his share to help make the government honest and helpful.

474. The Russian people.—The Russians are much better than their governments have been. They are big, strong people. Americans who have had charge of work in Russia say they are stronger and can do more work than can Americans. The village may have houses with dirt floors and straw roofs, but the people are polite, friendly, and musical. In America we have music as an accomplishment; but the Russian has music and dancing as ways of expressing his feelings, just as we smile or frown or laugh or cry. "How can we work if we do not sing?" said the boatmen on the Volga when asked why they sang as they worked. In traveling through Russia you may see the people of a peasant village out at almost any time of day, dancing on the board floor of a bridge or on a smooth place in the road. From the Russians we get the dances known as the polka, the mazurka, and the polonaise. Besides folk-dances, many folk-songs have been passed down by the people from one generation to the next.

475. Manufacturing in countries east of

Germany.—This great flat plain is nearly half of Europe and it has as many people as the United States, but as yet not much factory manufacturing has begun. The Russian Government and the roads have been so bad that Russia is a hundred years or more behind northwest Europe and the United States in many of the ways of doing things, and therefore in ways of thinking about things.

The life of the people in many parts of Russia reminds us a little of the life of the Douglas family in the Appalachian Mountains (Sec. 3). During the long winter months when the ground is snow-covered and there is little else to do, the people work in their homes at weaving, and at making baskets, leather goods, brushes, and many other small articles. It is only recently that factories and a few manufacturing cities have grown up in this part of the Great Plain, as they have in our own central farming region. Before the World War most of the Russian factories were owned and managed by foreigners—Germans, English, French, Danes, or Americans, who had studied engineering, and knew how to run machinery and factories.

Warsaw, the capital of Poland, and Lodz near it, are cotton- and wool-manufacturing centers, near the Polish coal fields. Riga and Reval are ports with less manufacturing than the Polish cities. Moscow, the old capital of Russia, is near the central coal field and manufactures much iron and leather. In the south, near the Sea of Azof, is a large coal field yielding most of Russia's coal.

During the Russian civil wars many of these factories stopped running. That was one of the reasons why Russians suffered so much.

476. Polish and Russian agriculture.—Most of the people of the whole great region

between Germany and Asia, and between the Baltic Sea and the Black Sea, are farmers. Among these hundreds of millions of people few can read or write, and they have suffered long from cruel and thieving government, and from war. Where these things happen, the people are ignorant and have poor tools, poor crops, and the people themselves are poor. Such people always have needless sickness and suffering.

Here one might ride, day after day, past gray villages from which the peasants go out on the level plain near by to work in their fields of rye, potatoes, barley, oats, wheat, or sugar beets. At noontime they eat a simple meal of black rye bread, cabbage, potatoes, and perhaps drink a little tea, but rarely have a bit of meat or eggs—these being the things they must sell to get money to pay taxes and to buy the few things they cannot do without.

477. The Russian wheat region.—The southern part of the plain, from Rumania eastward, is one of the two greatest inland wheat regions of the world. (Fig. 321.) Where is the other? (Fig. 88.) This great stretch of flat, treeless land has a very rich black soil and is known as the "Black Earth" country. It has a climate much like that in the central part of North America. Near the Black Sea it joins the European Corn Belt, and here the wheat is sown in the fall, as in Kansas and Nebraska, where wheat and corn are grown near each other. Farther east, the winters are colder, and scanty rain falls in the summer season as it does in our own Northern Wheat Region. As the climate is like that of North Dakota, we find the same method of growing wheat (Sec. 89), namely, sowing in the spring and harvesting in the autumn. Everywhere in the southern part of the great



Photo Wm. Thompson

Fig. 388. Russian peasants threshing wheat with flails. By a slight movement of the pole the club falls full length on the straw; see the woman's flail.

plain there is wheat, wheat, wheat, almost nothing but wheat, for fully a thousand miles. The soil is rich, but the rainfall is uncertain, and the ignorant Russian farmers, or moujiks, as they are called, cultivate the crop so poorly that the yield is only a third of that on German fields.

In this treeless region the moujik's house has a dirt floor, and walls made of sods piled one on the other, plastered with mud, and whitewashed. The roof is of sod or straw thatch held up on poles. Straw is burned in the stove. Near the rivers some of the richer people have wooden houses that have been floated down on rafts from the forests to the northward.

478. Migrating laborers.—Because of their poverty, many Poles used to go away each year to work in the harvest-fields of Germany, and even of Switzerland and Sweden. Before the World War as many as five million harvesters sometimes made a summer journey from Central Russia southward to the Wheat Belt (Fig. 321), and then worked their way northward with the advancing harvests.

479. The trade of Russia and Poland.—In times of peace, this great agricultural region of the eastern plain sends its surplus crops to the cities of western Europe. At the south, wheat goes from the port of



Photo. Wm. Thompson

Fig. 389. A Russian peasant and his daughter carving wooden toys. Is this highly-paid work?

Odessa, and from Rostof at the mouth of the Don. In the north, rye, oats, butter, eggs, and meat animals are shipped eastward from Petrograd, Riga, Koenigsberg, and Danzig. Much trade in times of peace goes overland by railroad into Germany.

The people of Russia still carry on much of their trade by fairs, as the people of England and of all Europe did before the coming of the steamship and the train.

Indeed, many of the cities of Europe were started by the fact that people met at certain places once a year to trade. Such an occasion they called a fair. It was really a market. In Russia to this day many such fairs are still held. After working all winter at their crafts, the shoemaker, the saddler, the basket-maker, and the weaver go off to the nearest fair and sell their year's produce to traveling merchants, or to people who are buying a year's supply.

The most famous of these fairs is at Nizhni Novgorod. The more regular transport of the railroad and the steamship are causing the fairs to decline.

Just as the farms of our own Wheat Belt receive manufactures from our own factory region, so the peasants of eastern Europe buy clothes, shoes, nails, machinery, and tools from the factory region of central Germany, from Norway and Sweden, and from the other factory regions on both sides of the English Channel. Before the World War the peasants had begun to use American

plows and reapers, which sometimes went by shiploads from America to Odessa.

480. Future of the great plain of central and eastern Europe.—In the western part of this region,—Norway, Sweden, Denmark, and central Germany,—there cannot be very much increase in food production because the land is already tilled so thoroughly and so well; but there might be many more comfortable manufacturing towns, if markets and supplies can be found in foreign countries.

Poland and Russia can double their food supply if the people can have peace, a chance to own land, and good schools where the children can learn better ways of doing things.

Such a great region should also have many small manufacturing cities, busy supplying local needs. The Russian coal fields will give the power, but the location of the towns for foreign trade is not so good as in the countries near the English channel. Then, too, the winter is so long and so very cold that people do not feel as much like working as people do in a climate that is less severe.

The Ural Mountain district has ores of iron and platinum which have been worked in the past and should be worked still more in the future.

Much, very much, depends upon the kind of government a country has. No one knows what the government of Russia will be, or what Russia's future will be.

QUESTIONS

1. Compare a railroad trip from Hamburg to Moscow with one from Columbus, Ohio, to Omaha, Nebraska, during late September, in length, number of cities, canals and rivers crossed, changes in climate, and crops in fields.
2. Does skating continue longer on the canals of Russia than in Holland?
3. In which place are the summers hotter? Why?
4. Compare the waterways of Germany with those of the United States.
5. Why were the colors of many manufactured materials in the United States so poor during the World War?
6. Compare the population of Germany and Russia per square mile. Can you give two good reasons for the difference?
7. Compare their education. What might Russia learn from Germany?
8. Compare Europe's great plain with the Great Plains of the United States in as many ways as you can. Are the trading facilities of the European plain better than those of the American plain? Which of these two plains has a better chance for future increase of population and industry?

9. Why should there be extensive agriculture in

Russia and intensive agriculture in Belgium? Compare the two systems. 10. Can you name five nations whose people have owned business enterprises in Russia? in Mexico? Why is such the case? 11. What waters are connected by the Kiel Canal? Prove on the map what time this canal saves for a boat going 14 miles per hour. 12. Name all the nations of this region established after the World War. Why was Danzig made a free port? 13. How would you give a Christmas entertainment that might be enjoyed in Germany? in Russia? in Norway?

14. Describe the trade between Denmark and England. 15. Compare the length of the day in Christianity and Berlin. Why is there this difference? 16. Why did the interruption of Germany's commerce by the delay in the peace negotiations interfere with the trade of the United States? Why did it interfere with the trade of Europe? 17. Why do manufacturers in the United States want a high tariff on toys? What difference does such a tariff make to Germany? How does it affect her ability to buy cotton? 18. If you would like to hear the most widely known of Russian folk songs, "Down Mother Volga," get the phonograph record "Wniz po Matuszkie," by Tchaikowsky. 19. What city is the birthplace of Hans Christian Andersen? Tell some of his fairy tales. 20. How do the oil wells of Baku help Russian trade? How does the oil reach Moscow?

GREAT NORTHERN FORESTS OF EUROPE

481. European regions that are like American regions.—In North America, as we go northward from the St. Lawrence valley and the Northern Wheat Region, we find a great belt of evergreen forest, and beyond it a treeless zone, or tundra, that reaches to the ice-bound Arctic Sea. Europe has similar regions. North of the Central European Plain is a belt of evergreen forest that reaches continuously from the Scandinavian mountains to the Ural Mountains and on across Asia to the Pacific. Like a part of the American forest, the great northern forest of Europe stands on a low plain that was once covered by an ice-sheet which has left many swamps and lakes, both large and small. As in America, this northern forest is a land of long cold winter and deep snow. Evergreen trees extend northward to the edge of the tundra. In the northern forests of Europe and Asia, as in those of America, the bear and the fur-gatherer roam the woods. The wild boar is still to be found there, and wolves sometimes pursue the

hunter and the traveler, as they do in all similar regions.

482. Two kinds of work.—This forested country of Sweden, Finland, and North Russia differs from the American forest by having some farmers in it. Land is so scarce in Europe that, with much labor, men have cleared away rocks and drained swamps and have made little farms in east Sweden and Finland. Most of these farmers have two kinds of work, one for the winter and another for the summer season. In the summer men tend their little farms, grow oats and potatoes, and make hay. When winter comes, they leave their wives and children to take care of the cows, while they go into the forests, where they camp all winter, chopping wood and dragging logs to the stream bank. In spring the logs are floated downstream, just as is done in the forests of New England and Canada. In some of the Swedish rivers special channels have been made by building canals around waterfalls. Thus the logs can rush down without lodging in the rocks.

483. The lumber ships.—When spring has melted the ice of winter and the northern waters are again open, hundreds of British, German, French, and Dutch ships hasten to the small ports along the Baltic Sea, the Gulf of Bothnia, the Gulf of Finland, and the White Sea. They return with loads of lumber, poles for coal mine props, and wood



Photo. International Film Service, N. Y.
Fig. 390. A fisherman's house on the stony shore of a narrow bay near the steep mountains and snowfields of northern Norway.



© Underwood & Underwood, N. Y.

Fig. 391. What is this boat doing here in the Swedish forest country? Compare with Fig. 259.

pulp for the paper mills. Sometimes all the parts of a wooden house are loaded on the ship and carried away, to be put up in some land across the sea. England is able to get along with only one-thirtieth of her land in forests because she uses the timber of this northern forest region, where nearly all the land is forest-covered.

484. The rafting trip.—The southeastern part of this forest is drained by the branches of the Volga, a splendid waterway for rafts. Each spring the timber-cutters from this part of the forest float their logs, lumber, and even finished houses down the river to market in the treeless wheat region. (Sec. 477.)

485. Iron ore and platinum.—About Lulea and Gellivare, in northern Sweden, are two of the great iron-mining districts of the Old World. Most of the ore from these mines is used in England and the Rhine district. In summer, ore ships go down the Gulf of Bothnia. In winter, they sail from Narvik in Norway, to which a special railroad has been built to carry ore across the mountains

during the months when the Baltic is frozen. Thus, because the warm Atlantic reaches these shores (Secs. 407-408), the Swedish iron mines can ship ore winter and summer, while the mines of the Lake Superior district, much farther south, must close in winter, because ice shuts the water highway between the mines and the furnaces.

In the part of this district near to the Ural Mountains there are mines that before the World War furnished nine-tenths of the world's platinum. This metal is heavier than gold and more costly. Most of it is used in chemical laboratories and in jewelry.

486. People.—We have already studied about the Russians and the Swedes, but most of the people of this region are Finns. The Finns, like the Swedes, are an intelligent, well-educated, liberty-loving people, but they were conquered a long time ago by Russia. Like the Poles, the Finns have suffered from the bad government of the Czar of Russia, and for generations they have longed to be independent. After the World War, Finland once more became a free and separate country.

487. Future.—This is not one of the regions where a large increase of population may be expected. There is little land suitable for farms. For manufactures other than those of wood, it is not so well equipped by nature as regions farther west. Nevertheless, the Finns, being an industrious, thrifty people, will make the best of their opportunities. Since most of their land should be a well-preserved forest, let us hope that they will be able to prevent forest fires. Sweden has already begun to take care of her forests in a scientific way.

QUESTIONS

1. Name the countries or parts of countries in this region. 2. Name three rivers that drain it, and state where they empty. 3. If you lived in this region, which would you enjoy the more, your summer or your winter work? Why? 4. Where is the iron ore of this region sent? Trace on the map the summer journey from Lulea, Sweden, to Newcastle, England; to Essen. Trace the winter journey. Which is the more expensive route? Why?

5. Did you ever see a box of safety matches with the name Sweden on the box? Why does Sweden

make matches? 6. What laws if well enforced are of the greatest importance to the countries in this region?

7. Fill in the following chart:

TOPIC.	IRON MINED IN SWEDEN.	IRON MINED AROUND LAKE SUPERIOR.
Amount of ore mined..		
Cities to which shipped		
Transportation:		
in winter.....		
in summer.....		

ARCTIC PASTURES

488. Another Tundra Region.—North of the evergreen forests, at the very top of the continent, is the treeless tundra. If you were dropped down upon it you could not tell whether you were in North Canada, North Alaska (Sec. 355), or North Russia. Here, on the wide plain that reaches from the Atlantic across Europe and Asia to Bering Strait, live the people who tamed the reindeer long ago, while our ancestors, who lived farther south, were taming the cow, the horse, the sheep, and the pig.

The reindeer is the animal best suited to be of use to men living in the tundra. It has wide, flat hoofs that enable it to walk on the wet earth or the snow crust without sinking in. Its hoofs are also long, and therefore good to dig under the snow of the Arctic blizzard to get grass and moss that serve as food. Having a skin covered with warm, thick hair, the reindeer is as much at home in



Photo. Frank H. Nowell

Fig. 392. Milking time in Lapland. What would happen to the Laplanders if they lost all their reindeer?



Fig. 393. A sod-covered hut, the summer home of a family of Lapps.

the cold tundra as are sheep on the Scotch highlands, or cattle on the ranches of Texas.

489. Lapland.—The European tundra is a land where yellowish men live. No one knows when they first came there with their flocks from Asia. These tent-dwelling people live in tribes. Between the White Sea and the Atlantic Ocean, their country is known as Lapland. The only property the Lapps have is a herd of reindeer and such things as can be carried by men aided by reindeer. The useful deer carry the Lapps on their backs in summer, drag their sleds across the snow in winter, furnish their owners with meat, milk, and cheese for food, and with skins for clothes and tents. Reindeer skin makes the warmest kind of leather gloves, so the skins are prized by people who live in regions where the winters are cold. Though Lapland is a part of Norway, Sweden, and Finland, the Lapps may be said to govern themselves, because when they move about with their flocks and herds they are far away from the seats of government.

You remember (Sec. 357) that when Mr. Jackson wanted someone to teach the Eskimos in Alaska how to become reindeer farmers, he sent to Lapland for reindeer and for herders to teach their art.

490. Future.—For ages the tundra has had as many reindeer as its scanty pastures could feed and as many nomads as its reindeer could support. In the future this region will probably not change, unless minerals should be found. The results of finding minerals are shown by what is happening at Spitzbergen.

491. Spitzbergen, a group of Arctic islands larger in total area than West Virginia, and lying about 500 miles north of Norway, belongs in this region. Owing to the influence of the warm Atlantic currents the harbors on the south-west are open to steamships from May to October, and only the northeastern parts are glacier covered. Before the World War, tourist vessels visited Spitzbergen regularly, and men have often stayed to hunt walrus, seal, polar bear, and fox; but in those days no one ever really made his home there. The island was a no-man's-land until it was given to Norway by the Peace Conference at Paris, in 1919.

There are large deposits of coal that may in time supply Norway's needs. When the Vikings discovered Spitzbergen in the twelfth century, they called it the "land of coal coasts". Norwegian and Swedish coal-miners now work there all the year. They use electric light in the mines and all through the months of winter darkness. Thus Spitzbergen may become a home for men during the long period while they are digging out the minerals which nature has placed there. It would seem strange to live in a land where for two months in summer there is no sunset and for two months in winter no sunrise, and where there are whole days of evening twilight and whole days of dawn.

QUESTIONS

1. Compare the Lapps and the American Eskimo in regard to houses, means of travel, and method of making a living. 2. What determines the changes of season in this region? (See Appendix.) 3. Compare Spitzbergen with Greenland in climate; in the possibilities of mining.

4. How has nature fitted the reindeer to live in the tundra? 5. What animals do for us some of the things the reindeer does for the Lapps?

6. How would you like to live in Spitzbergen? What would you eat, wear, play?

THE HIGH MOUNTAINS OF EUROPE

492. Well-placed mountains.—Europe is more lucky than North America in the kinds of high mountains it has.

On the physical map of Europe notice that the high mountain wall extending from west to east is broken by wide openings into four sections. Find these sections: 1, Cantabrians and Pyrenees; 2, Alps; 3, Caucasus; 4, Carpathians. On the physical map of North America see if you can find a place in the western mountains where the wall is broken by wide openings.



Fig. 394. The management of the Swiss National Railways publishes as an advertisement in New York newspapers a map showing Switzerland black like this. What does it show? (Sec. 499.) We have added the leading waterways to the Swiss railway map. Has America such a set of waterways?

We shall also study the mountains of Scandinavia in this chapter, because they, too, are high mountains of Europe.

If the high mountain wall of Europe had been as unbroken, as that of North America, it would have been extremely difficult for ancient peoples to have crossed from one side of the mountain ranges to the other side. But Europe is lucky in that the wide openings in her mountain wall have always allowed the people to pass. In recent times roads have been improved

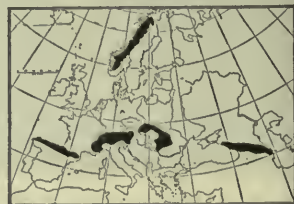


Fig. 395. The high mountains of Europe.



Photo. Publishers' Photo Service, N. Y.

Fig. 396. The lake and city of Geneva, Switzerland, the meeting place of the League of Nations. Why may Geneva be called the world's capital? See rock layers in the face of the great cliff. Mt. Blanc is in the dim distance.

and extended, and tunnels have been dug through the mountains themselves. One of the Alpine tunnels, through which a railroad passes, is eleven miles long—the Simplon, between Switzerland and Italy, more than twice as long as any tunnel in the United States.

In their highest parts all of these five high mountains save the Carpathians rise to the height of perpetual snow. Both sides of the five great ranges are swept by rain-bearing winds. This abundant moisture gives the mountains a good cover of trees and grass wherever there is earth to feed plants.

Since the higher parts are not desirable places in which to live, most of the people live in the lower parts of the mountains. Valleys open out in almost every direction, and people from different parts of Europe have entered the valleys and settled there. This makes a varied and interesting mountain population. We shall study the mountain groups separately.

I.—THE ALPS

493. Switzerland.—The Alps mountain system curves like an arch from the Mediterranean, near Nice, around the north of Italy, to the Adriatic Sea at Trieste. The Alps also reach eastward nearly to Vienna.

The central Alps spread out into several ranges with valleys between, making room for Switzerland to be a real mountain nation. The Swiss people show the world how to live in mountains, how to care for mountains, and how to enjoy mountain life.

In Switzerland, some of the valleys open to the west towards France. Most of the people of that part of Switzerland are French. In the valleys opening north, many of the people are German. In the valleys opening south, they are Italian. Thus the people who live in Switzerland speak French, German, and Italian, and the Swiss Government has to publish notices in the three languages. But no matter what language a man may speak, he is extremely loyal to Switzerland, and he will tell you that he is *Swiss*.

The Swiss Government is a democracy. Its people have attained a high state of civilization. In few countries, if in any, are people more nearly equal than in Switzerland. Few Swiss are very rich, and few are very poor. Nearly everyone can read and write, and most of the people are well-educated and trained to do things requiring much skill.

494. Agriculture.—The Swiss take good care of their beautiful, rugged little country,



Fig. 397. A street in a Swiss town. What is white coal? Photo. Publishers' Photo Service, N. Y. present.

So much of their land is only cold, snowy mountaintops that they must make the little good land they have do a great deal for them, since there are many people and but few resources. The valley lands are in well-tilled fields of wheat, potatoes, oats, and barley. On the lower slopes are many orchards, which make large yields. Vineyards, which require much heat, thrive on some of the hillsides that face south and overlook lakes. The lakes act as a mirror and throw the warm rays of the sun upon the vineyards. Hay is grown on many lower mountain-slopes that are too steep to be used for fields or orchards. The people often irrigate these steep hayfields by turning streams of melted snow upon the fields to water the crops. In a place like this a crop of hay must be cut with a scythe.

Above the orchards and fields the mountain-sides are used for forest and pasture. Valley farmers follow their herds of cows and goats as they climb higher and higher to get the rich pasture that quickly springs up after snow melts. The cowherd lives in a rude summer camp, and goes from camp to camp until the cows are back again to spend the winter in the valley barn.

In winter, the Swiss farmer takes his sled and hauls the haystacks from the lower slopes to the barn. He also hauls firewood and sawlogs from the wooded slopes.

Dairying is one of the chief industries of Switzerland. In one year during the World War she exported 75,000,000 pounds of cheese. This amounted to eleven dollars for every man, woman, and child in Switzerland. We have no export in the United States that amounts to so much per person as do dairy products for the Swiss. In some Swiss valleys every bride receives a cow for a wedding

495. Forestry.—On some of the Swiss mountainsides, trees have been carefully tended since the time of Columbus. Swiss trees receive the regular and skilful care that a farmer would give to a crop of corn. For centuries the forests have been protected from fire, and the trees cut as they were ready. Many a stone wall in Holland rests on a foundation of piles made of Swiss tree-trunks. The logs were taken down the Rhine in boats that had brought up wheat, corn, and cottonseed meal.

In bad weather, when the people must stay indoors, they often do wood-carving. They carve chairs, wooden spoons, and salad forks, toy animals, and many other things which we find in American toy stores.

496. The avalanche.—The avalanche of sliding snow is one of the dangers of Swiss mountain life. At times travelers or even entire villages are buried in this sudden snowslide. On some of the mountains, avalanches occur so often that people have to be very careful where they build their houses, and in certain valleys the people scarcely leave their villages all winter long, for fear of being buried by a snowslide.

The Swiss mountaineer often lives in a wooden house called a chalet. (Fig. 400.) It has a rather flat roof, on which the snow will lie and serve as a blanket to keep the house warm.

497. Two examples of Swiss thrift.—In

many parts of the United States we have lost hundreds of thousands of acres of good land, which might have made thousands of farms, because rushing water has cut gullies and carried the good soil away (Fig. 82). The same thing was sure to happen in mountainous Switzerland, and because the people of that little country could not afford to have land wasted, they prevented that kind of trouble. They found that in some locations goats in pasturing clipped the grass so close that the soil was washed away, but that cows did not eat grass so close. Laws were then passed reducing the number of goats and increasing the number of cows that might feed on certain pastures. Thus the grass cover was protected and the soil was kept from washing away (Fig. 400). This is a good example of the conservation of resources.

Swiss thrift and care are also shown by the bee industry. There is not land enough to raise many sugar beets, but a substitute is found in honey, which bees make from the fir tree. Many thousands of hives of bees are kept, and less sugar must be bought.

498. Manufactures.—Switzerland has no coal of her own, but now that steamboats can come up the Rhine to Basel, coal is



Photo. Publishers' Photo Service, N. Y.

Fig. 399. English teams playing a hockey match on St. Moritz Lake, Switzerland. On the left is one of the goals. Other Swiss sports are tobogganing, sledding, and curling, a game played by sliding stones on the ice.

brought from the coal fields along the Ruhr and the Saar, branches of the Rhine. (Sec. 448.) Little coal is needed in Switzerland except for heating purposes, because the Swiss have harnessed the Alpine waterfalls, turned their power into electricity, and carried the electricity to most of the towns and cities. In many localities electric power is in every house, and much manufacturing is done in the homes of the people with the aid of motor-driven machinery.

Switzerland is not a land of many cities, but Berne, the capital, Geneva, on Lake Geneva, Lucerne, on beautiful Lake Lucerne, and Zurich, the largest city, are all neat and thriving centers of manufacture, trade, and travel.

As Switzerland has no raw materials other than milk, stone, salt mines, and wood, her industries must make valuable things from small amounts of raw material. This is well shown in the heavy export of ribbons made from Japanese silk; of lace made from American cotton; of fine machinery made of imported iron and copper; and of milk chocolate made of cocoa beans from along the equator and milk from herds on her own mountain pastures. The best example of all is found in the Swiss watch, of which Geneva is a great manufacturing center. A jeweler can establish his reputation if he can say that he was trained in Switzerland.



Fig. 398. A tunnel entrance on a double-track Swiss railroad. Is there a wagon road in the picture?

499. The tourist industry.— Beautiful scenery attracts many travelers to Switzerland. People like to see quaint villages with trim gardens and neat fields, and cozy chalets on the green mountainsides. They like to hear the musical chimes of the churches, and the tinkling of the cowbells on the distant pasture. The white flash of the waterfall pleases the eye, and the murmur of the waters lulls to sleep. The smooth surface of clear lakes reflects the mountains like a mirror. There is charm in the green forest and in the distant, white snowfield. The steep and dangerous snow-clad peak dares those who like to do hard things. Expert Swiss guides will show the way.

Switzerland has the best location in the world to tempt many travelers. It is near the middle of Europe. (Fig. 394.) It is on the road for travelers going from densely-populated northwest Europe to Italy, to enjoy the charm of warm winter sunshine. There are railway tickets that are sold cheaply, and which will permit travelers to ride for weeks, as much as they please, on any railroad in Switzerland. The Swiss people make travelers comfortable by providing good food, good beds, good roads, and delightful foot-paths.

The climate also attracts. The summer is cool, pleasant, and refreshing. Switzerland advertises her winter sports of coasting, snowshoeing, skiing, skating, and ice games. Swiss weather can be freezing and at the same time comfortable, for the surrounding mountain walls keep off the cold winds.

Except for the tiny state of Monaco, on the Riviera (Sec. 548), no other country in the world gets so much of its living from the traveler who goes seeking pleasure and vacation.

500. The Austrian Alps.—German-speaking Austria owns as much of the Alps as does Switzerland. This section is not so high as the Swiss Alps. It does not have so many snowfields, or so many through routes to Italy, and it has not succeeded in getting

much tourist business. The people here make their living, as do some of the Swiss, by a little mining, farming, and timber cutting.

501. The western Alps, which belong to France and Italy, are much like the Austrian Alps in appearance, uses, and the life of the people. The only important difference is that more manufacturing is done in the French Alps than in the Austrian Alps.

502. Belts or zones of climate on mountains.— In ascending the Alps and many other high mountains, a climber crosses several belts or zones of climate. (Fig. 1.) The first



Courtesy Peters' Swiss Chocolate Co.

Fig. 400. A Swiss chalet or mountain house in the high Alps. Why are stones laid on the roof?

Alpine zone would be the warm valleys at the foot, where there are farms and orchards, with groves of chestnut and walnut trees. Next comes the zone where beech and maple trees grow, and fields of rye and potatoes. Then comes the zone of the pine and the fir, with dwarf pine, shrubs, and berry bushes at its upper edge. Next, on the slope where it is too cold for trees or bushes, he finds a belt of grass and flowers much like those of the Arctic tundra. This belt extends to the last mountain zone—the zone of snow and

ice, which covers the tops of all very high mountains.

Thus the high mountain shows us in a few miles all the climate belts and plant belts that we would find in a journey from the Erie Canal Belt to the Greenland Ice Cap, or from the foot of the Alps to northern Spitzbergen.

503. The Alps as a type.—We have spent much more time studying the Alps than we can spend on the other high mountains. But in studying the Alps we have learned about the kinds of life on the high mountains, so that we do not need to have it so fully explained again.

II. THE PYRENEES AND THE CANTABRIANS

504. Another mountain region with three languages.—The western part of the high mountains of Europe stretches for five hundred miles across the width of Spain. From the Bay of Biscay to the Mediterranean Sea the Pyrenees have no break. The north side of the mountains is almost as steep as a wall, although the south side slopes more gently. Railroads do not cross the Pyrenees. They have to creep around the ends. These mountains form a national racial and language boundary. The people on one side of the slope speak French and those on the other side speak Spanish. Those who live in the Cantabrians speak Basque, the language of the people who were in these mountains before the French and Spanish came.

We do not find here the towns, the factories, and the tourists of Switzerland. Except for one or two resorts, this mountain

region is a land of the mountain farmer and the shepherd. In the summer great flocks of sheep are taken from the lowlands on both sides of the mountains to eat the grass on the high pastures.

505. A tiny country.—The little valley of Andorra on the French side of the Pyrenees is an interesting example of the way mountain peoples love their liberty and often get it. This country is one of the many hundreds of little states into which Europe was once

divided. This little valley, surrounded by high peaks, is but seventeen by eighteen miles. The population is only five thousand, but the valley is a republic in which the people rule themselves and are entirely independent, except that the President of France, and the Bishop of Orget, in Spain, take turns appointing a magistrate and a judge. Besides that, the people of Andorra pay a tribute of \$200 a year to France, and \$90 a year to the Bishop.



Photo. Publishers' Photo Service, N. Y.
Fig. 401. In this landscape in southern Switzerland, what do you see that shows Switzerland to be a well-cared-for country?

III. THE CARPATHIANS

506. An island of forest in a sea of farms.

—To what country do the Carpathians belong? These mountains are not so high as the other three mountain systems of southern Europe. Their tops have Alpine pastures, but no snow-capped peaks. The mountains are mostly ridges covered with rather poor, sandy soil, and having great forests that have been well cared for by the governments of Hungary and Rumania. The chief products are wood, hogs fattened on acorns and beech nuts, and sheep which pasture on the high places in summer and go to the low plains of Hungary and Rumania for winter feeding.



Photo. International Film Service, N. Y.

Fig. 402. Bringing milk down from the Alpine pastures. How may it be exported?

IV.—THE CAUCASUS

507. A region of many races.—This mountain system has the highest ranges in Europe. Some peaks are over three and a half miles above the sea. Less rain falls upon these mountains than upon the Pyrenees and the Alps, so the lower slopes are not quite so good for farming.

The Caucasus is a wild part of the world. In the thick forests of the remote sections, the hunter may still find bears, panthers, tigers, wild goats, wild hogs, deer, and even the European bison. On both sides of this region roving tribes of nomads have lived for ages, and the Caucasus has been the scene of many wars between bands of people fighting for homelands. So many different peoples have worked their way in here, that it is said that in the city of Tiflis seventy-two languages and dialects are spoken. Less than a hundred years have passed since the Russians conquered this region and diminished the fighting among the different peoples.

The people are farmers and shepherds.

They know little of factories, tourists, or schools. There are few roads other than trails anywhere in these mountains, and many of the tribes still live in far-away valleys where they have very little trade. Like the Douglas family, they must use the spinning wheel and the handloom, and make nearly everything they use. (Secs. 3, 4.)

V.—THE HIGH MOUNTAINS OF SCANDINAVIA

508. The mountains of the north.—Europe has one more high mountain region, which is off by itself in Norway and Sweden—the Scandinavian Mountains. They are not so high as the Alps, but they are so far north that they have the same zones of climate as do the Alps, with large areas of snow-field.

In summer, the farmers of Norway, on one side of the mountains, and of Sweden, on the other side, drive their cattle, sheep, and goats to the upland pastures, as do the Swiss. The rough land and the cool, moist winds from the Atlantic make farming almost impossible and haying very difficult. (Fig. 330.) Some of the hayfields are in places which are so steep and rocky that a wagon cannot reach them, so the hay is brought down on



Fig. 403. A cyclone on its way from western France to north central Russia. Be sure you understand the series of cyclone maps shown, Figs. 59 to 62. What kind of wind and weather is this cyclone making at Bordeaux? at Copenhagen? at Geneva? at Vienna? on the south slope of the Alps? When the center "L" has moved to Czechoslovakia, what will the wind and weather be on the north side of the Alps? It will do the same for the Carpathians as it does for the Alps. Can you explain now why west Europe is a well-watered region?



Photo. Publishers' Photo Service, N. Y.

Fig. 404. Lugano, on Lake Lugano, in the Swiss Alps near the Italian border.

little overhead trolleys that run on wires stretched from high cliffs. It is no wonder that the people who have been able to make a living in such a hard country become prosperous when they go to a land of better opportunity, such as the United States and Canada.

509. Water power.—This mountain region is rich in water power, which is its greatest resource. What do you know about its rainfall? (Fig. 318.) The streams that come down from Scandinavian snowfields and glacial lakes have much water and many waterfalls. Some of the best water-power plants in the world are there, and many more can be built. If the people should fully develop the water power, what will they do with it? Will they make textiles and other articles that require many workers and many cities, or will they use the electricity in electric furnaces which require few workers to smelt iron ore, or will they use it to make nitrates for fertilizer? (Sec. 256.) In these northern lands the winter is so long, cold, and dark that it is not as pleasant a place in which to live and work as are England, France, the Low Countries, and western Germany. At present the furnace, not the factory, uses most of the Scandinavian water power. There is a plan to carry electric power by cable from the mountains of Norway under the sea to

Denmark, whose flatness leaves her almost entirely without water power.

Thus the Kiolen Mountains, like the Sierra and the Alps, may send the means of livelihood to people who never saw their snow-clad summits or forest-clad slopes.

510. The future of these high mountains.—For the future, as in the present, all these high mountain ranges of Europe must remain for the most part in forests and partly in pastures, with farms only in the little valleys and on the lower slopes. The forests on the Alps and those on the French side of the Pyrenees are as well cared for as any in the world. The Spanish and Russian forests have been neglected, and can be greatly improved if the governments are made more efficient.

In these mountain regions there is one great resource yet largely unused—water power. It has been only a short time since we learned how to make wheels strong enough to use big waterfalls or high waterfalls. It has been only a short time, also, since we learned how to turn the power into electricity and to carry it on wires to places far away. We have only begun to do these things.

It is estimated that France alone has



Fig. 405. A waterfall, penstocks (Fig. 261), and power plant in the Scandinavian Mountains. Can you trace the wagon road?

enough waterfalls on the north slope of the Pyrenees and on the west slope of the Alps to make power every minute, night and day, equal to 7,000,000 horses working at their best. If France had to get that much power from coal, it would take about 40,000,000 tons a year, which is about twice as much coal as France digs in a year. There is unused water power, also, on the south slope of the Pyrenees, in the Swiss and the Austrian Alps, in the Caucasus, and in Scandinavia.

Recently, plans have been made to build big water-power plants in all of these mountains, and doubtless many such plants will be built, and the power may be carried by wire to distant places. The Pacific States show the way to do this (Fig. 194); so does Italy. In north Italy, water wheels in the Alps furnish light and power for the cities of Milan and Turin. The Europeans speak of this power from the snowfields as "white coal". It lasts longer than black coal, because nature furnishes a new supply each year.

Europe does not have much coal. It is possible that thousands of years hence, when the mines of England, Germany, and Pennsylvania have yielded all their coal, the beautiful mountain barriers of Europe will still have their zones of snowfields, their zones of pastures, and their zones of forests. Their valleys may be filled with gardens and nestling towns and cities, where millions of people may work in factories and live in houses heated and lighted by electricity which comes from distant waterfalls.

QUESTIONS

1. Name all the countries that are included or partly included in these regions. 2. Compare the sports of Switzerland with those of England. Which

do you think you would most enjoy? 3. Would it be better for farming in Finland if the Kiölen Mountains ran parallel with the Pyrenees? Why? 4. Why do so few people live on the tops of high mountains? What region previously studied do these tops of high mountains most resemble? Why? 5. Give three reasons why the Swiss people are to be admired. 6. What is the most mountainous country in Europe? Through what four large rivers does the snow from the summit of the Alps find its way to the sea? Are the mountains of Europe a hindrance or a help to the countries? When answering, consider (a) the effect of the mountains upon climate and rainfall; (b) isolation; (c) communication; (d) natural resources; and (e) the resulting effects upon the customs and the life of the people.

8. Why have the Basques, the original inhabitants of the Pyrenees, never been dislodged from their land?

9. Tell why you think there is less travel in the Austrian Alps than in the Swiss Alps? 10. What is meant by the snow line? Why is the snow line higher in the Caucasus than in the Pyrenees and the Alps? How would the height of the snow line of the Kiölen Mountains compare with the height of the snow line in the Caucasus? Why? 11. If you took a trip to Switzerland, what curios would you expect to bring back?

12. Would you like to go to the Scandinavian Mountains to live? Give a reason for your answer. 13. What advantage would it be to the people of the United States, if the water power of these European mountain regions were used to run factories? 14. If possible, get the record, "Shepherd Life in the Alps," and play it on the victrola. See how large a collection of pictures of European mountains you can borrow from friends, and bring them to class. 15. Sum up Switzerland's advantages for trade under the following headings:

RAW MATERIALS.	TRANSPORTATION FACILITIES.	ARTICLES MANUFACTURED.	COAST LINE.

16. Why do the Carpathians have less water power in summer than the other high mountains? 17. Grass grows very quickly where summer snow melts on high mountains. Can you explain how this can be so? Name some of the lakes of Switzerland; the principal cities; three of the famous mountain peaks. 18. Why is Switzerland a good place for the seat of the League of Nations? 19. See what you can find out about the famous statue, The Lion of Lucerne.



Fig. 406. Guild halls, several hundred years old, facing a public square in Frankfort-on-the-Main, Germany. This is one of many quaint old cities with many interesting sights in the Central European Uplands.

Photo. Keystone View Co., N. Y.

CENTRAL EUROPEAN UPLANDS

511. Location and character.—A wide region of low mountains and valleys lies like an arch north of the Alps. On the east it reaches almost to the Carpathians, and on the southwest almost to the Pyrenees. What regions does it touch? As the sharp Alps may be likened to our sharp Rockies, so this Central European Upland, composed of old, rounded mountains, may be likened to our Appalachian region and the Adirondacks. It has few long, parallel ridges like the Alleghenies, but has, instead, a number of old plateaus into which the rivers have worn many irregular valleys.

512. People, history, and government.—Just as our Appalachians reach through several states, so the Central European Highlands are a part of several different countries. Name them. What languages are spoken?

The central west includes the well-known French departments (corresponding to our states) of Alsace and Lorraine, which the Germans and French have in turn taken from each other by wars. Between France and Germany is Luxemburg, a tiny state which remained independent when the other German states united to form the German Empire.

In the French and Belgian sections, much of the land is in small farms. So great is the peasant-owner's love of his land that during the World War families sometimes stayed on their farms even while the enemy was bombarding them.

East of the Rhine are the well-known German states of Bavaria, the capital of which is Munich; Wurtemberg, the capital of which is Stuttgart; and many smaller states.

The northern part of the highlands comprises a part of the German state of Prussia, and the eastern part of Bohemia. The Bohemians, called Czechs, with their chief city at Prague, are one of the many Slav races.

After the Czechs had been ruled for many long years by the German-speaking Austrians, the World War made their country again independent, and added to it the lands of the Slovaks, another Slavic people. Czechoslovakia now has a parliament and a president. Name the capital.

513. A beautiful, well-kept land.—These Central Highlands of Europe are beautiful and well-kept. From lookouts on a thousand hills the traveler may see down into valleys where the unfenced little fields lie spread out in patches showing many shades of green, yellow, and brown.

Through every valley goes a shining white road, passing like a great ribbon through one farm village after another, each with its shade trees and church spire, and surrounded by its many well-tilled little fields. Here and there we see a city, with factory smokestacks, and boats on a river. Perhaps it took generations of labor for men to make the stream into a useful waterway. From the lookout you can walk along a well-leveled forest path to a pic-



Courtesy U. S. Dept. Agr.

Fig. 407. Middle-aged spruce forest, Austria. What do the stumps tell you?

turesque little inn or coffeehouse, whose keeper seems glad to make you comfortable.

514. Ease of travel.—Fortunately for the people who live in this region, several large rivers have made wonderful thoroughfares through it. No valley here is as long as the Great Valley that passes through our own Appalachians, but these European valleys are even better highways because they can be used by boats. Trace the course of the rivers Rhone, Seine, and Rhine. Observe how close together their upper waters are. Canals have been cut to join the three rivers, and boats can pass from one river to another.

The Rhine Valley is a highway by which boats can cross this entire upland region from Switzerland to the sea. What cities are on the Rhine? By way of what river do boats from Hamburg pass into the Bohemian plain? A canal connects this river with the Danube. The Danube furnishes an east and west thoroughfare through the highlands. A canal connects it with a branch of the Rhine called the Main. Besides these routes for transportation by water, there are many railroads in this region.

515. Mountains called forests.—What different mountain ranges can you name in this region? Many of these mountains are so well covered with forest that they are

spoken of not as mountains but as forests. Thus Germany has the Black Forest (in German "Wald"). There are many others.

516. Forestry.—Since this region has been settled for hundreds of years, and has a dense population (see the table below), the people have been compelled to cultivate their land well, and to take good care of their forests. A hundred years ago there was almost a wood famine here because sheep and cattle and forest fire had been allowed to eat up the little trees, as they so often do in America.

AREA AND POPULATION OF SOME UPLAND STATES

POLITICAL DIVISION.	AREA IN Sq. MILES.	POPULATION.	PEOPLE TO Sq. MILE.
Czechoslovakia.....	56,316	13,914,000	249
Bavaria.....	30,562	6,962,000	236
Wurtemberg.....	7,534	2,438,000	323
Seven departments of France in the Cevennes.....	17,046	2,187,000	118
Pennsylvania.....	44,832	8,720,017	194
West Virginia.....	24,022	1,463,701	61

What timber there was had been carelessly cut. With this neglect of forest, wood became scarce and so costly that the European people began to think about these things, and resolved to take better care of their forests. They have made great changes in one hundred years. You can now travel in this region for days without seeing bare mountainsides made desolate by fires, such as are so common in almost every American state.

Wood is so costly in that densely peopled land that the forests are planted with little trees three or four feet apart, much as we plant corn. When the tree-trunks are the size of a man's wrist, some of them are cut to be used for bean poles and fence palings.



Fig. 408. Austrian forestry students having a class. What are some of them doing? Why is it a good thing for a country to have students of forestry?

Courtesy U. S. Dept. Agr.

When those that remain are the size of an arm, some are cut for firewood. Thus the forests are cut over many times, until finally only a crop of sawlogs remains. When the last trees are cut, every scrap is used. Even the twigs are taken to the bakery to make a quick fire that will bake crisp-crust bread. Then the forest is planted out again to raise another crop. In this region the forester is a very important man; he goes about with his dog at his heels, taking care of the precious trees of the beautiful forest.



Courtesy U. S. Dept. Agr.

Fig. 410. An Austrian forest called the Vienna Forest. Why should this land be in forest? The foreground is young forest. The background is mature forest being clean cut, ready to start another.

517. Agriculture.—What

Europe has done with these low mountains we shall some day have to do with our eastern highlands. The people cultivate as much of the Central European Upland as they can. The valleys are in farms, most of them small with no fences between them. Some of the hillsides also are cultivated, and there are farms on many level hilltops. Long ago, before Australia, Argentina, and many other distant lands began to produce wool for the European market, many flocks of sheep were kept on the hilly pastures of the Central Highlands. Now, instead of sheep, goats and cows are usually kept because these animals give milk, while wool can be imported from foreign lands. To feed the animals in winter,

large crops of hay, barley, oats, and beets are grown. It is too cold for corn, and little wheat is grown, except in the French section along the upper Rhone. Rye is often grown on the uplands.

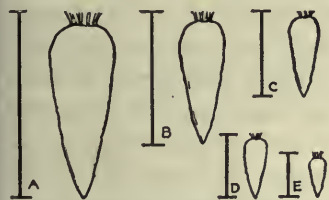


Fig. 409. Five leading nations in production of beet sugar, 1913.

Short tons

A. Germany	2,900,000
B. Austria-Hungary	2,090,000
C. Russia	1,340,000
D. France	950,000
E. United States	690,000

The poorest part of the whole region is the upland of the Cevennes west of the Rhone, much of which is only a poor pasture.

Many of the hillsides sloping south are covered with orchards and vineyards. The most famous wine-producing section is near the upper Rhone in France, in the province of Burgundy. It is called the "Côte d'Or," meaning "side of gold," because the valuable grapes from its hillsides have brought in so much money.

The largest agricultural section of this whole region is in the valley of the upper Elbe, the Bohemian plain around Prague. Here the patient workers weed by hand the little beets which in autumn will make the rich harvest of beet sugar, enough for their own dense population and much to spare for export. Great quantities of potatoes, barley, oats, and rye are also grown, for much food is needed where so many people live, and the small farms have to be intensively cultivated.

518. Mining and manufacturing.—There is a small coal field and some iron ore in the French highland west of the Rhone. These resources have made the French town of St. Etienne a famous iron-manufacturing center. Many French cannon have been



Photo. Underwood & Underwood N. Y.

Fig. 411. A street in Prague. Locate the city. Of what country is it the capital?

produced there. The French town of Nancy is also an iron-manufacturing center. One of the great iron-ore regions of the world is in Lorraine. It produces much of the ore for French, German, and Belgian furnaces (Sec. 448). Longwy and Briey are ore-mining districts. The most important field of good coal is in the valley of the Saar River, which is a branch of the Rhine. This valuable field belongs to Germany, but the exclusive right of mining coal for fifteen years was given to France in 1919 by the Paris Peace Conference, to help pay for the French mines near Lille which the Germans had destroyed during the World War.

Czechoslovakia has coal fields in connection with which have grown up industries in iron, glass, and steel.

519. Fine goods.—Since this Central Upland region has less coal than England, and since it does not enjoy the advantage of being situated near the sea, its people have had to make the most of small things. There

are so many people that labor is cheap, and much work is done by hand, such as toy making and wood carving. Most of the toys we had before the World War came from this region, and most of the canaries in our cages came from the Hartz Mountains, where the people raise birds in their homes. The city of Jena has a great factory famous for the manufacture of field glasses, opera glasses, and microscopes. Lyons manufactures much silk. Why do you think that the industries of this beautiful upland region should be somewhat like those of New England? (Sec. 316.)

520. Trade and transportation.—This region cannot greatly increase its output of wood or of food, because the forests and farms are already so carefully used. There is little coal, and it is not of the best quality, but there are great quantities of iron ore in Alsace and Luxemburg. This will continue to furnish a great export to the iron furnaces of Germany, Belgium, and France. (Sec. 448.)

If manufacturing cities increase in the uplands, it will be the result of the great labor men have done and are still doing to build railroads, dig canals, and deepen rivers. Manufacturing can prosper only where there is good transportation. The French have begun to make a barge route from Switzerland to the Mediterranean by way of the Rhone River. The project will require twelve or fifteen years for completion, but when finished the route will be as good as that furnished by the Rhine (Sec. 445) from Switzerland to the North Sea. It will permit boats much like those of the New York Barge Canal to go from Marseille to the Swiss boundary. Not only will the River Rhone be improved for navigation, but water-power plants will be built for manufacturing, and several hundred thousand acres of land will be irrigated, so that agriculture may be much more intensive, and several crops a year be grown.

These two waterways, to the north and to the south, will be a help to Switzerland as well as to the Central Highlands through which they pass.

521. Tourists.—Among Europeans, a fa-

favorite way of spending a summer vacation is that of taking walking trips through these forested highlands, stopping for the night at comfortable inns which offer inexpensive hospitality. Before the World War tens of thousands of people, carrying knapsacks, enjoyed themselves in that way. Among these travelers were many groups of school-children with their teachers. There are excellent roads and many good paths in the shady forest. The summer climate is cool, and the distances are short enough to make walking trips a pleasure in these highlands. Almost every town is in beautiful surroundings and has a local organization called the "Beautifying Union," that marks historic spots with monuments, and lays out walks, parks, and pleasure grounds. Travelers will continue to bring income to parts of this region, where hotelkeeping has become an art.

QUESTIONS

1. What countries of Europe lie in the Central Upland Region? 2. What makes the Rhine so picturesque? 3. Do you think it would be an easy river to cross? What is its greatest use? 4. Describe some scenes as one sails down it. 5. Why was the loss of Bohemia a great blow to Austria? Tell of its wealth in agriculture, mining, and manufacturing. 6. On what river is its capital city? 7. Tell the story of your travels as you go with a cargo of Czechoslovakian goods to Manchester from Prague. 8. Name five products your ship is carrying. 9. Name five products she will bring on the return voyage. 10. Should Austria rule the Czechoslovaks? 11. Why are the vineyards planted on the south-sloping hillsides? 12. How is land protected from erosion in this region? 13. What does the Elbe do for the trade of Czechoslovakia? 14. Name the countries of central Europe that must send their exports through another country. 15. How might this condition lead to war? 16. How should such trade be controlled?

17. Make a list of and locate all the coal fields in this region. 18. What makes Alsace-Lorraine so desirable to France and Germany? 19. After the World War, how did the peasant of France show his love for his devastated homeland? What countries use the River Rhine to carry their freight? 20. Fill in as many facts as you can about one important city in each country of this region:

CITY.	COUNTRY.	CHIEF INDUSTRY.	FOR WHAT ESPECIALLY NOTED.

21. Of what value to agriculture, manufacturing, and commerce will be the French improvements on the Rhone? 22. What countries will be benefited? 23. Fill in the following diagram:

RIVER.	SOURCE.	FLOWS THROUGH.	EMPTIES INTO.	CITIES ON IT.
Rhine...				
Elbe...				
Rhone...				

24. Tell about a cheap vacation trip you would like to take in the Central European Uplands; about a more expensive one.



Photo. Keystone View Co., N. Y.

Fig. 412. Balkan peasant women spinning flax.

THE BALKAN MOUNTAIN REGION

522. An isolated region.—The region of the Balkan Peninsula is very different indeed from the Central European Uplands. Travel is very difficult there. So many rivers have cut deep valleys in the Central European Uplands that boats can go to the interior by several routes. (Sec. 514.) In the Balkan Peninsula there is only one navigable river.

This mountain region is the most shut-in and isolated part of Europe.

The mountains of the Balkan Peninsula are not a range or a plateau. They are for the most part a jumble of mountains which often shut people in from all the world and separate the different groups of peoples each from the other. The life of the peoples who live here is more backward or primitive than it would be if the same people could



Courtesy The American Red Cross Society

Fig. 413. A view of Serajevo, a city in Bosnia, long a part of the Turkish Empire, later taken by Austria, but now a part of Yugoslavia because the people are Serbs. The sharp minaret and dome show Turkish influence.

live somewhere else where means of communication are easier.

Many of the Balkan Mountains are made of limestone rock with the usual caves and underground passages into which surface waters disappear, to come out miles away as large springs. (Sec. 21.) Thus, some sections have no surface streams at all, and it is hard for the people to get drinking water. In a few places one finds a valley having a flowing stream. But suddenly the stream disappears and the traveler is surprised to find that it flows underneath a mountain, and because there is no valley the traveler must climb over the mountaintop to reach the other side.

The high mountain wall of the Dinaric Alps shuts both travelers and streams away from the Adriatic shore. (Sec. 548.) Where do most of the streams that drain the region near the Adriatic finally go?

The best way to understand the Balkan countries is to think of them as being a large region somewhat like a rough and mountainous plateau. (Sec. 3.) It is very difficult to make either highways or railroads through such a mass of mountains and shut-in valleys; and for this reason many

people in the Balkans live in places to which they can travel or carry freight only on the backs of animals.

523. A backward region.—Such an isolated country is a hard place in which to make a good living, and the people have been further handicapped by wars and unjust rulers. The Albanians seem to have been the original race. No one knows when they came, but their land is so rough and difficult for the traveler that it has never been thoroughly conquered. The Greeks took the Ægean shores four thousand years ago. Later came the South Slavs, who took the territory to the

north of Albania; then came the Bulgars, who took the land to the east; and finally, in 1453, the Turks came across from Asia Minor, captured Constantinople, and took possession of most of the Balkan region; but even they never succeeded in ruling some of the Albanians or the people of the Black Mountains (Montenegro) just north of Albania.

524. The Turkish Empire.—For more than five hundred years the peoples of the Balkans suffered from the unjust and cruel oppression of the Turks. In the height of their power the Turks had a large empire, reaching from the Persian Gulf to the Danube. It also included most of North Africa.

Then one by one the peoples gained their independence. The Greeks living in Athens and the parts of Greece to the south of Athens became free early in the 19th Century. By a gradual process, ending in 1878, Bulgaria, Rumania, and Serbia, which is now a part of Yugoslavia, became almost or quite self-governing, but Turkey still had a strip of territory extending from the Black Sea to the Adriatic. Turkish rule lasted so long because of the jealousies of England, France,

Germany, Italy, and Russia. The governments of these five big countries let the sultan rule in the Balkans and live in Constantinople, because all feared that his removal would upset the balance of power by letting some strong nation get this key-point to southern Europe and Asia.

In 1912-13 all the Balkan countries joined in a war against Turkey, and together they took more territory away from the sultan. After the World War, these countries were again enlarged in the attempt to let each people rule itself. Even this change has not ended the troubles of these peoples, because in many localities people of different races are so mixed up that it seems impossible for any Balkan country to become one people. Perhaps in one village the people are Greeks, in the next Turks, in the next Bulgars or Serbs or Albanians. In the southern part of the Morava-Vardar passageway, or corridor (Sec. 525), ease of travel has made the people a mixture of races.

For two thousand years the south central part of the Balkans has been called Macedonia, because a kingdom of that name was there in very ancient days. Later it became part of the territory ruled by the Turks. The southern part, inhabited chiefly by Greeks, was given to Greece in 1919, after the World War.

On the level prairies of Canada or the United States, it is easy for people to move about and thus to get acquainted and to understand each other. For this reason we can have in America one government ruling a territory larger than four or five of the jealous Balkan countries.

525. The Morava-Vardar corridor.—There is, however, one open valley extending the entire width of the region. (Fig. 385.) It is the valley of the Morava, a river that flows north to the Danube near Belgrade, and near its source almost joins the valley of the Vardar River, which flows southward to the Aegean Sea near the port of Saloniki. The waters of these two streams are so near together that the Germans planned to join them by a canal when they were in possession of the

country during the World War. The Serbians hope to complete the canal.

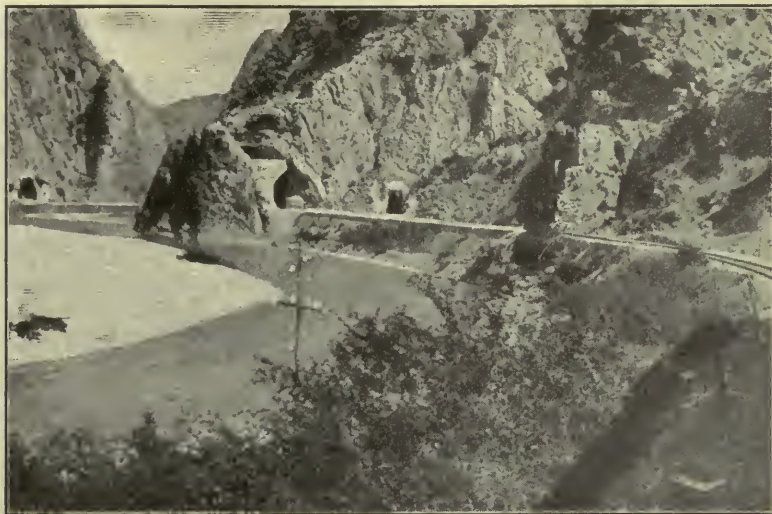
This Morava-Vardar valley is one of the world's oldest thoroughfares. No one knows when bands of migrating people first began to go through it. Four thousand years ago the Greeks passed this way from the region of Odessa to their new home on the shores of the Aegean Sea. In Roman times one of the great Roman roads went up this valley to the provinces on the Danube, and Uskub (or Skoplje), then as now, was a trading center on a much-used route. During the World War the German and Allied Armies fought up and down the valley for possession of the Balkans. Express trains from Paris and Berlin to Constantinople run through the Morava Valley and turn east to Sofia.

526. Governments.—Yugoslavia is the country of the South Slavs. "Jug" (pronounced "yug") means south. The South Slavs are really three peoples very much alike and called the Serbs, Croats, and Slovenes. The different states of Yugoslavia unite to elect a king and parliament, very much as the various states of the United States unite to elect a president and congress.

Bulgaria and Greece have each a king and a parliament.

The people of Albania still live in tribes having chiefs. The Albanians are such very independent people that they do not know how to coöperate. Many of them will not even pay taxes, so their country cannot have roads or schools or hospitals or other things found in more progressive countries.

An American relief worker, writing about his Albanian headquarters in 1920, said, "The first fortification is a barbed-wire fence. Inside of this is a half-wild dog. Then comes a brick wall two feet thick peppered with gun holes. There is another dog inside this wall. Then comes the house. The door is massive oak held by a lock, an inside bar, and a hidden catch. The bottom floor has no windows and is used only for stock. The second floor has only very small windows, but the third floor has fairly good-sized windows. Every window has a thick,



Courtesy American Friends' Service Committee. Photo. J. L. Lippincott

Fig. 414. How would you travel down this Balkan Valley if the tunnels were not there? The Germans dug these tunnels during the World War.

fairly bullet-proof shutter. The walls of the house are about a yard thick." What does that house tell you of Albania's past?

527. Agriculture and manufacturing.—The unfortunate peoples of the Balkans have escaped from the rule of the Turk so recently that many of the people are still poor and uneducated, although their lands are rich in undeveloped resources. Before the World War more than one million people from Jugoslavia alone had gone to the United States, seeking a better chance to make a living and to be free.

Owing to bad government and the lack of chance to trade, eighty to ninety per cent of the people of the Balkans are obliged not only to till the soil, but to do most of their own manufacturing as well. In Serbia and in parts of the other countries each farmer has a small tract of his own of about ten to thirty acres. Serbia is so rough and steep that most of it remains in pasture. Sheep, goats, and cattle make up the chief wealth of the country. Before the World War, Serbia and Bulgaria alone had nearly one-fourth as many sheep as the United States.

The methods and tools used in farming are poor. The plowing is often done with a wooden plow drawn by oxen. Oxen are used

because they are cheaper than horses. A working horse needs grain as well as hay. In 1920, during the high prices as a result of the World War, it cost \$400 to feed a horse for a year in the southern Balkans, but an ox could be fed for \$70 a year, because an ox could live on grass in summer and straw in winter, and could finally be sold for food.

The fields near the villages produce wheat and barley for bread, oats and corn for the animals, and sometimes tobacco to sell. The people can afford to

send bales of wool, skins of animals, and tobacco long distances on muleback because those products bring a high price per pound.

In some of the localities that are near the few railroads, or the seacoast, or the Danube River, plums are grown, some of which are used to make jam that is sent to England. Dried prunes are sent from Serbia and Bosnia to Bordeaux, France, where they are repacked and sold as French prunes.

528. The Balkan villages.—As in most parts of Europe, the farmers usually live in villages. The houses often have stone walls, dirt floors, and roofs thatched with straw. Thus the only wood necessary is that used for doors, windows, and rafters. In other sections, the house has walls of mud plastered on lath that are nailed to a wooden framework. Owing to the small amount of trade, the farmers' village is often almost self-supporting. The women spin by hand the wool from their sheep, and then weave it into cloth, of which they make clothing. Women and girls knit thick woolen stockings, sometimes putting in gay colors and designs. Often they knit as they walk about watching the flocks at pasture.

The Balkan people love bright colors. They have many gay costumes, each locality having its own style, which perhaps has not

been changed for five hundred years. There are many feast days and holidays. Then the people put on their best clothes and have music, singing, and folk-dancing.

529. Undeveloped resources.—The Balkans are a region in which there is room for a great increase of industry, wealth, and comfort. Why may there be a great increase of wealth? Six words will give the answer: education, work, roads, machines, minerals, manufacture.

Many of the Balkan people cannot yet read and write; they work inefficiently, and as nations they are poor. In the days of the Turkish rule it scarcely paid the people to save either money or goods, because the Turkish tax-gatherer would come and take away everything that could be moved. How does this affect the country in which it happens? Now the Turkish rule is ended, and although Serbia and Bulgaria lost almost half of their men through the World War, these people have already settled down to build up their countries.

We can easily see that trade has scarcely begun in Albania. The country is larger than New Hampshire and has twice as many people, but there is not a mile of railroad within its limits. There is good land in some of its valleys, and fine pine timber on some of its mountains.

The city of Uskub is located on the Belgrade-Saloniki railroad at a place where a short branch line comes in from the west. This little town is the trading center for a million and a half of people; as many as live in the states of Maine, New Hampshire, and Vermont. These people are living in villages up the valleys, and over the hills, in places where nearly all of their trade must go by wagon or pack-mule. More roads



Courtesy American Friends Service Committee. Photo, J. L. Lippincott
Fig. 415. A group of Serbian villagers who stopped working to let an American relief worker photograph them.

and more railroads are needed to develop modern trade in the Balkan region. Within the last hundred years such opportunities for trade have come to nearly all the other places in all the continents of the world where white people live.

530. The coming of machinery.—Most of the farming is done by hand and with the help of crude implements. Some people think that the grain yields of Bulgaria could be doubled if the people had better tools and could learn the methods which are very well known to the people of most other countries.

531. Minerals.—Minerals may help to make the Balkans as prosperous as the Central European Uplands. Serbia has rich mines of copper and iron. For a long time some gold has been mined and there are several small coal fields. All this mineral wealth may furnish work for many people.

532. Labor supply.—This region has one great resource necessary for manufacturing, and that is labor supply. Its population is much more dense than that of any agricultural section of the United States, and a dense population furnishes a supply of labor for factories. In the past the Balkan people have been making their own clothes by hand and also selling carpets that they weave by

hand. If they should get machinery from England, France, and America, they could make many times as much carpet or cloth. If the Balkans can have peace we may expect their agricultural output to double, their mineral output to much more than double, and many little valley villages to grow into manufacturing towns with the aid of coal from their hills and water power from their mountain streams.

The Balkan countries are very jealous of their natural resources and are watchful to see that foreign capital does not secure too powerful a hold on their countries. Laws requiring that a majority of stock shall be held by the local government and by local people tend to discourage foreign capital. But industrial leadership may develop among those Bulgars, Serbs, Croats, and Greeks who have lived for a time in the United States and, having gained wealth and business knowledge, now wish to go back to their native land to help make it prosperous and progressive.

QUESTIONS

1. What peoples make up the Kingdom of Yugoslavia? 2. Has it a good sea-coast? 3. Can you explain why in this region the condition of industry is backward? 4. Why do the Balkan farmers live in villages? 5. In what manufacturing resources does this region surpass Iowa? 6. Fill in the chart for the following cities:

CITY.	COUNTRY.	WHY IMPORTANT.
Sofia.....		
Fiume.....		
Serajevo.....		
Uskub.....		

7. Can the need for transportation facilities be supplied? How?

8. Why is it that Montenegro was never conquered until the World War? 9. Why are the finest Turkish rugs considered more beautiful than most rugs made in the United States? 10. Why are their equals not made in America? 11. Work out a series of tableaux:
No. 1—Scene in a field: Balkans at work;
No. 2—Scene: Interior of a Balkan house;
No. 3—Scene: Feast day on a village street.
12. Sum up Bulgaria's agricultural advantages under the following headings:

CLIMATE.	SOIL.	SURFACE.	METHODS OF AGRICULTURE.

13. How did the Germans plan to use the Vardar Valley in the Berlin-to-Bagdad Railroad? 14. Why did so much fighting during the World War take place in the Balkan Region? 15. To whom did Herzegovina and Bosnia belong before the war? 16. Where is Valona? (Fig. 385.) Why would Italy like to own it? 17. Sum up Yugoslavia's advantages for trade under the following headings:

RAW MATERIALS.	TRANSPORTATION FACILITIES.	ARTICLES MANUFACTURED.	COAST LINE.

18. How did the World War change the political map of the Balkan Region? Make two lists of the countries, one as they were before the war, and the other as they are to-day.



© Publishers' Photo Service, N. Y.
Fig. 416. A Slovenian peasant woman dressed in her best native style.

THE EUROPEAN CORN BELT AND THE VIENNA BASIN

533. Summer rain in the interior of a continent.—We found (Sec. 73) that there is summer rain in the Central Farming Region of North America. This area is almost in the middle of the North American continent. We find summer rainfall also in Hungary, Rumania, south Russia, and central Asia. This is very important for the farmer. Where there is much summer rain and a long season of warm weather, there are corn belts. Where there is little rain and

a cooler, shorter summer, there are spring-wheat belts. (Sec. 89.)

PART I.—THE EUROPEAN CORN BELT

534. Bounds and climate.—The European Corn Belt is tucked in between the Alps, the Balkans, and the Black Sea. It is really divided into two parts by the Carpathians. North of the Carpathians the summer is too cool for corn, and east of Odessa the summer rainfall is too light. South of the Danube Valley, the Balkan Highlands are the boundary. (Fig. 319.)

Another way of thinking of this corn belt is to say that it consists of the lower valley

of the Dneister, the middle and lower parts of the Danube Valley, and the valley of the Pruth, a branch of the Danube.

535. Agriculture.—To understand this country, we must think of the western part of our own corn belt. You remember (Sec. 74) that the farmer of eastern Kansas often has a field of corn, a field of wheat, a field of hay, and some cattle or hogs. The same plan is followed in Hungary, because the country is the same—a fine, rich, level land, with a summer hot enough and moist enough for corn, and a winter climate that suits wheat. Therefore, the Hungarian farmers grow wheat, corn, and hay, and keep animals.

The central part of the Hungarian plain has less rainfall than the sections nearer the mountains, and some of it, like our own Great Plains, is too dry for grain crops. On these wide, flat stretches are ranches where horses, mules, and cattle are pastured in large droves.

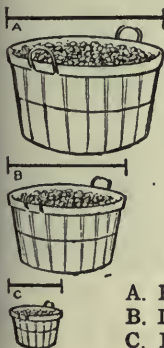
The part of Rumania east of the Carpathians is much like Hungary, except that there is less rain. Droughts are more frequent and the corn crop fails more often. The Rumanian farmer plows his fields with oxen. Can you tell why? (Sec. 527.) Since the grain supply is irregular, the farmers must keep fewer animals than do the farmers in America. If they tried to keep many cattle they would have no feed for them in the years of poor crops, so they sell the grain when they have harvested a crop. This shows why many more cattle and hogs are kept in the Middle Danube than in the Lower Danube District.

The people of the European Corn Belt

make their living largely by selling corn and wheat. Many of them eat corn bread because it is less expensive than wheat bread. Some of the export grain goes by river boats up the Danube into south Ger-

Fig. 417. Bushels of corn in 1912-13:

A. European Corn Belt.....	466,000,000
B. Illinois.....	354,000,000
C. Mediterranean Countries.	167,000,000



Finch & Baker, U. S. Dept. Agr.

Fig. 418. Europe's corn acreage. Compare it with that of the United States, Fig. 56, and with Europe's rye acreage, Fig. 379.

many, or by canal boat into the basin of the Elbe in Czechoslovakia and on to central Germany. More of it reaches the markets of south Europe and west Europe by way of the ocean steamers that come up the Danube River.

Some tobacco is grown in central Hungary, but the chief thing to remember about the agriculture of this region is its likeness to that of our own western Corn Belt.

536. People.—Several peoples live in this region. Chief among them are Rumanians, Hungarians, and the Slovaks in the eastern part of Czechoslovakia. In nearly all of this region, counts and dukes own large estates on which many tenant farmers live. Most of these farmers live in villages and go out each day to work in the fields around the village. On holidays the people dress up in gaily-colored costumes of native style. They are fond of singing, music, and dancing. Perhaps you have heard some Hungarian music.

537. Cities.—All the chief cities, save Odessa, a seaport, and Bucharest, a capital, are along the Danube, the great commercial thoroughfare of this region. Much work has been done to make it possible for boats to pass around the rapids at the place called the Iron Gate, where the river has cut a notch through the mountains that separate the Hungarian and the Rumanian plains.

It is interesting to compare pairs of cities



Fig. 419. Spring plowing in Rumania. Is this efficient labor? (Figs. 17, 98.) Can it be highly paid labor?

in the American and European Corn Belts and also a pair of corn ports:

PAIRS OF CORN-BELT CITIES AND CORN PORTS

CITY.	POPULATION.	CITY.	POPULATION.
Bucharest....	346,000	Omaha.....	191,000
Belgrade.....	91,000	Topeka.....	50,000
Budapest....	880,000	Kansas City..	324,000
Odessa.....	631,000	Galveston....	44,000

The European cities are larger than the American cities because, as the table below shows, the European region is much more densely peopled than the American region.

POPULATION DENSITY IN CORN-BELT STATES

	AREA. Sq. MILES.	POPULATION.	PEOPLE TO Sq. MILE.
Rumania	122,282	17,393,000	149.
Kansas	81,774	1,769,000	21.6
Nebraska	75,808	1,296,000	16.9

538. Future.—(Sec. 535.)

The uneducated peasants can learn to cultivate their fields somewhat better,

but there is not room for many more farms. When the Rumanian Government helped farmers to buy land after the World War it tried to get twelve and a half acres for each family. The average farm in Kansas is more than ten times as large as that. Unless this region can build cities, it may continue to be as it has been in the past—a place from which people have migrated by the thousands, seeking places where there were more resources and more chance for work at good

pay. Many Hungarians and Rumanians have come to America.

Can this European Corn Belt have a large city population?

There has long been some manufacturing in Budapest and Vienna, but only a small part of the products were for export. Places in northwest Europe have locations so much better for manufacturing, that the European Corn Belt may continue to be a region living



Photo. by Elmendorf.

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Fig. 420. What will probably be done with the grain that we see on this quay at Budapest? How does this dock differ from the one shown in Fig. 45?

chiefly by the export of farm produce, and with a population but little larger than it now has.

PART II.—THE VIENNA BASIN AND VIENNA

539. **Bounds and climate.**—Ranges of hills cross the Hungarian plain near Budapest, leaving to the north a smaller plain of which Hungary, Austria, and Czechoslovakia each have a part. This small plain, being farther north and also of higher elevation than the Great Plain of Hungary, is cooler than the latter. As it has more rain, the farmer grows more potatoes with his wheat and hay, and less corn.

Here, in a kind of gateway to central Europe, stands Vienna, at the place where valleys open out in three directions. To what countries and places do these valleys lead? (Fig. 319.)

Vienna was a gay and beautiful city when she was the capital of the big Austro-Hungarian Empire. Here lived tens of thousands of army officers, clerks in the many government offices, financiers, and merchants who had business with all the provinces. Hither came the rich landlords from the provinces and travelers from everywhere to visit one of the great cities of the world, and perhaps to study music or visit the opera. At that time Vienna had over two million people. To-day the city is in a sad plight. A tenth of her people went away within three years after the World War. No longer is she the capital of an empire, but only of the little agricultural state of Austria, which is largely made up of the poorer part of the Alps. Gone are the most of the army officers, the landlords, the tens of thousands of government employees. If new industries locate in the city it may recover its former importance.

QUESTIONS

1. Why does Rumania not raise as many hogs as Iowa does? 2. Trace a shipment of corn down the Danube from the Plains of Hungary to England. 3. Trace the journey of their wheat up the Danube to Basel: by ocean to Marseille. 4. Name a tributary of the Danube rising in the Alps, one in the Carpathians, and one in the Balkan Mountains. 5. As you enter the harbor of Odessa, what buildings would you see like those bordering the harbor of Buffalo? (Fig. 281.)

6. What kinds of factories can Vienna build with profit? 7. What are some of the necessities which this region must import? 8. Make a chart for Rumania like Question 10, page 236.

9. Why do so many Rumanians and Hungarians emigrate to America? 10. Suppose a farmer, a cowboy, a preacher, a doctor, a sailor, a laborer, a mechanic, a banker, a chauffeur, a fisherman, a miner, and a business man from the United States should go to this region. Which of the men would find employment? Why? Which would be as prosperous as in the United States? Where do you think each man would find his special occupation?

THE MEDITERRANEAN REGION

540. **Location and surface.**—The Mediterranean Region lies in three continents. Name them. Name the regions that touch it. Beginning at the Strait of Gibraltar (Fig. 445) follow the fringe of land, and name all the countries or parts of countries that are included. It seems strange to find a small part of the shores of the Black Sea included here, but there is a good reason for it.

We can think of this region as a fringe of land around the edge of the great blue Mediterranean Sea—a land which receives both heat and moisture from the warm water which it surrounds. Every country and almost every island included in it is mountainous, and the region is one of great natural beauty. The mountains seem to be purple, or blue, or green. The blue sea is dotted with beautiful islands.

Examine the physical maps (Figs. 445, 319) and see if you can tell why many peoples have entered the Mediterranean Region, and why many nations are there now.



Fig. 421. A view of part of the ancient city of Pisa, Italy, with its medieval wall and the beautiful church with the famous leaning tower.



Fig. 422. The public square in Venice, showing a famous bronze lion many centuries old standing on a tall pillar in front of the Doge's Palace. The Doge was the president of Venice when she was a city republic and the financial center of the world.

541. Interesting lands for travelers.—In a region that has been the home of so many races, and that has had so many empires, kingdoms, and civilizations, many interesting ruins tell the story of the past. Beautiful Greek temples still stand, not only in Greece itself, but also in Sicily and in Asia Minor. Roman arches stand in the south of France, and wonderful ruins of Roman cities are to be seen in the goat and camel pastures of Tunis, Algeria, and Syria, and beyond Jordan.

542. Ancient capitals.—In this region many cities, both large and small, are rich with the remains of ancient glory. Five of them were ancient capitals and four are still capitals.

(1) Rome was the seat of the ancient Roman Empire for many centuries. Next to Paris and London, Rome is the greatest center of travel in the old world. The palaces of the Pope and of the King of Italy are here. Rome has many modern and ancient churches. Palaces, temples, theaters, tombs, prisons, and many other buildings are left from the time when Rome ruled all of the world that was then thought worth hav-

Fig. 423. Population per square mile:

A. Italy (1915)	326.5
B. California (1920)	22.0
Do Californians emigrate to Italy?	

ing. Why is it called "the Eternal City"?

(2) Jerusalem is precious alike to Jew and Christian. It is visited by

many people who are interested in seeing sacred places mentioned in the Bible.

(3) Athens was once the most famous city of the world—famous for its learned men, for the books they wrote, and for the sculptures and buildings that they made. The modern Greeks want to make Athens a great city again. The Olympic games, which were the great sport events of the ancient Greeks, were revived in 1896, and are held every four years, in different countries of the world.

(4) Constantinople has long been one of the great cities of the world. For many centuries it was the capital of the Eastern Roman Empire, and later of the Turkish Empire. At the beginning of the World War, it was the fourth city of Europe in size. Its greatness arises from its location, which is at one of the great crossroads of the world. All traffic between the Black Sea and the Mediterranean passes through the crooked straits of the Bosphorus and the Dardanelles. Across these narrow straits,



Fig. 424. A view of part of Jerusalem. Where there is but little snow the roofs can be flat. They serve as porches when the sun is not shining.

travel and trade between Europe and Asia are easy.

Many races mingle in Constantinople. Men of many lands go there to trade. Constantinople is famous for its bazaars and for the workshops where the oriental craftsmen make their artistic wares of cotton, wool, and silk, wood, leather, and iron and other metals.

This great city is coveted by a hundred million Christians of the Greek Church and by two hundred million Mohammedans. The head church of the Mohammedan world is the Mosque of St. Sophia in Constantinople. Before the Turks took the city, in 1453, St. Sophia had been for hundreds of years the most important church of the Greek Catholics. The Mohammedans cling to this mosque, and the Christians of eastern Europe want to get it back.

(5) Venice, the island city, with canals for streets, is one of the most glorious of cities to visit. She has not been pillaged or ruined for six hundred years. As the capital of the Republic of Venice, she was to the Mediterranean world what London has been to Europe for so many years. (Sec. 433.) Her palaces, churches, and public buildings are



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Fig. 426. St. Sophia, Constantinople. This ancient shrine is one of the very interesting buildings of Europe.

among the most beautiful in the world. To-day she supports herself largely from the tourists who visit the city. She also manufactures cotton and "Venetian" glass.

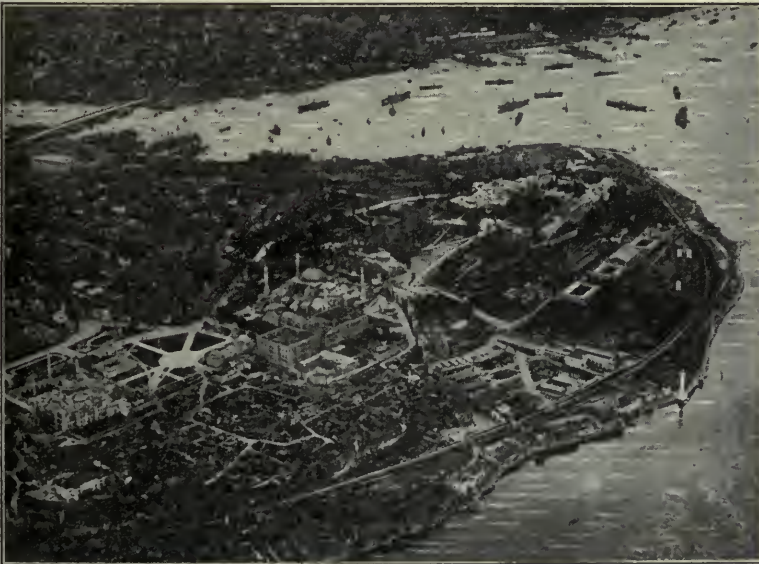


Fig. 425. A part of Constantinople. The narrow water where the ships lie is called the Golden Horn. For the good of all the world, who should rule Constantinople and the straits? Why?

From The World's Photos

543. Present-day peoples and their governments.— There are many different governments as well as many peoples in this region. Portugal is a republic; Spain, Italy, and Greece are monarchies, each with a king, and a parliament having less power than the British or a Scandinavian parliament. Greece gained greatly when the men who wrote the Treaty of Versailles, after the World War, tried to give all peoples the chance to rule themselves. For about a hundred years only that part of the Greek race which lived in Greece had been independent; the

PHYSICAL AND POLITICAL MAP OF PALESTINE

SCALE OF MILES

Biblical names are shown
Railroads

Fig. 427.

rest of the Greeks in Macedonia, Asia Minor, and on the islands of the Ægean, had been ruled by the Turk. Now, after more than two thousand years of foreign rule, nearly all the Greeks are united under their own king. We have already studied the government of the Serbs, of the Albanians (Sec. 526), and of the French. (Sec. 458.)

544. The Spaniards, Italians, and Greeks are gay and merry people. They are fond of music, and many of them love to wear bright-colored clothing. On holidays and feast days the people often sing and dance out of doors. Many towns or districts have special styles of clothing, and some of the people would no more think of changing the style of their clothes than they would think of changing their flag. It is believed that the beauty of the region has helped to inspire many painters, sculptors, and architects whose works have helped to make Greece, Italy, and Spain famous.

The Spaniards and Portuguese suffer from the results of their wrong ideas about work. Many of them still think that a gentleman should neither work, nor have anything to do with a factory, a store, or a farm. Hence most of the work in these countries is done by the uneducated and, therefore, the less efficient people. The ablest people of Spain and Portugal try to enter one of the

professions, or government employ, or the army. If they cannot do this they too often waste their time sitting about the cafés doing nothing. These people could double the products of their coun-



Photo. Wm. Thompson

Fig. 429. A water carrier in Andalusia, Spain. In the distance women are washing clothes at the river's edge.

try if they had sensible ideas about work.

545. Arabs.—On the eastern and southern shores of the Mediterranean are the Arabs—tall, solemn, dark-skinned people, most of whom dress in long, white, flowing robes. (Fig. 447).

Most of the people of Palestine and Syria are Arabs, although a part of them are Jews. Palestine is now under the protection of England and it is planned that it shall again become a Jewish state.

546. Peoples of North Africa.—In Tunis, Algeria, and Morocco there is a mixture of races. The Arab lives in the lowlands. The highlands are still held by the ancient Berbers. (Sec. 577.) In 1830 France began to take possession of Algeria. In 1881 she began to take Tunis, and a few years ago Spain and France began to take possession of Morocco. The conquest has required much fighting, but the coasts are controlled by the armies of France and Spain, and gradually these Europeans are taking town after town in the interior, and are stopping the wars between the different native tribes which have fought each other for so many centuries.

Those parts of the Mediterranean Region that were ruled by the Turk or the Arab can double their products and their population if they can have a more just and honest



Finch & Baker, U. S. Dept. Agr.

Fig. 428. Italy's rice acreage. Why is rice not grown in other parts of Italy?



Fig. 430. Portuguese flax combers dressed in native costume.

Photo. Wm. Thompson

government, better education for the people, and scientific methods in agriculture.

547. Climate.—You remember (Sec. 65) that the United States lies in the zone of prevailing westerly winds. Europe does also. Just as California has winter rains and summer drought, so has the Mediterranean Region, and for the same reason. (Secs. 182, 193.) We may think of this region as the California of the Old World, so similar are the two regions in climate and products. In southern California, we found that the forests grew only on the higher mountains. It is the same in the Mediterranean Region. Frosts are common in winter, but snow comes seldom. In spring the land is green with grass. In summer the sun shines without mercy for days and weeks and months. The grass withers; almost the whole region is brown. In summer, dust rises from the roads and settles on everything. Pasturing animals climb far away to the mountain pastures to get fresh grass. The heat of the summer noon is so

intense that the people have formed the habit of stopping work for a few hours in the middle of the day. They rest in the shade and refresh themselves by taking a nap, which the Spanish call a *siesta*.

548. Warm sheltered nooks.—The mountain walls to the north of the Mediterranean keep off the cold winds of winter, and therefore places at the southern base of the mountains are warm in the same way that the sunny side of a house wall is warm on a cold, windy, winter day.

In these sheltered nooks many crops can be grown much farther north than one would expect to find them.

(1) One of the warm nooks is south of the Sierra Nevada Mountains, in southern Spain. It contains the garden spots of Malaga and Almeria, rich in fruit like Pasadena (Sec. 180).

(2) Another warm sheltered nook is the Riviera, along the Gulf of Genoa, in Italy. It is on the express-train route from Paris to Rome, and has become a famous pleasure region. Many of the people from north Europe and elsewhere spend part of the



Photo. Keystone View Co., N. Y.

Fig. 431. San Remo, a pleasure resort on the Riviera. Here the leading men of Europe held many important conferences following the World War.

winter there, much as our people visit Florida and California. The little patches of land that lie between the mountains and the sea are clustered thick with villages, gardens, and hotels.

(3) Along the east shore of the Adriatic is a warm coast called Dalmatia, sheltered by the Dinaric Alps. This region, though famous for the beauty of its steep mountain landscapes and for its rich gardens, is not so easily reached as is the Riviera, and therefore is not so much visited.

(4) Other strange little areas of warm lands lie along the south slopes of the Caucasus and the Crimean Mountains, north of the Black Sea. The Crimea is as far north as Minneapolis, Minnesota, and Augusta, Maine, but the high mountain wall to the north and the sea to the south give it such a warm winter that it has a heavy export of oranges, figs, and pomegranates.

549. Desert winds.—The Mediterranean Region has one trouble that does not come so often to California. It has the desert wind. From the great desert of the Sahara a hot wind, called the sirocco, may sometimes blow for two or three days at a time. It dries up the crops in Spain and Italy. On the island of Madeira, off the coast of North Africa, this wind is called *l'este* (the east), and it has been known to bring ruin to the grape crop of that populous little island.



Finch & Baker, U. S. Dept. Agr.

Fig. 432. As in all countries of scanty rain, only a tiny fraction of the land can be irrigated. Contrast with Fig. 130.



Courtesy U. S. Dept. Agr.

Fig. 433. Peasants in southern Italy making hay with American mowing machines. Chicago furnishes many such machines to Europe.

do people live in such a country? We shall see many ways in which this climate decides what man must do.

551. Mediterranean food.—The commonest meal in America is bread and butter, meat, and potatoes. The commonest meal in the Mediterranean region consists of bread, olive oil, beans, and some green vegetables. We have already found (Sec. 133) that the winter rain suits wheat and barley well. Therefore the hills and plains in the moister, northern parts are green with wheat in the spring, and yellow with its harvest in early summer. In the drier southern parts barley, which looks much like wheat, but needs less rain, often takes the place of wheat as a crop.

As this whole region has many people to the square mile (table, p. 278), the need for bread has made them work very hard to raise grain. They sometimes grow grain in most difficult places, even in little patches of ground on mountainsides where the plow cannot go, and where the ground must be broken up with a spade or a fork. At harvest the grain is cut with a sickle, and carried down the mountain on the backs of men or donkeys. In spite of all this labor, no part of the Mediterranean lands except North Africa produces enough wheat for the bread it needs. Does corn, the great forage grain of America, grow well in the Mediterranean climate? (Sec. 203.)

550. Climate and men.—We have seen that the Mediterranean Region has a rainy winter and spring and a dry summer. How



Photo. Wm. Thompson

Fig. 434. Portuguese peasants beating corn from the cobs with flails. Are wages high or low here? Why? (Sec. 551.)

We can now see that people in these countries have hard work to get enough to eat. Animals cannot get corn, as animals do in the United States, or potatoes, as they do in Germany. Then, too, the population is so dense that the small farms must be used

TABLE OF AREAS, POPULATION, AND DENSITY OF POPULATION IN EUROPE AND THE UNITED STATES

COUNTRY.	AREA, Sq. Miles.	POPULATION.	PEOPLE TO Sq. Mile.
Spain.....	194,780	21,000,000	106
Portugal.....	35,490	6,000,000	329
Italy.....	110,632	36,000,000	326
Greece.....	41,933	4,821,000	115
United States...	2,974,000	105,972,000	35.5
California.....	155,652	3,426,000	22

to raise food for men instead of food for animals. Therefore, not having animals, instead of meat people eat many varieties of bears, some of which are unknown to us in the United States. Many different kinds of vegetables are abundantly produced.

552. Fish.—The pounding sound one often hears in the towns of these countries is not made by the carpenter. Someone is pounding a hard, dried codfish from Norway or Newfoundland, getting it ready to cook. Because dried codfish keeps well in hot weather it is a very important food in

Mediterranean countries, where there is so little meat.

On the Atlantic coasts of Spain and Portugal, quantities of sardines are caught. Enough sardines are packed each year at the port of Vigo for every person in the United States to have a box.

553. Irrigation.—In the Mediterranean Region one often hears a creaking sound. It is the *noria*, a simple machine by means of which a donkey, walking in a circle, lifts water from a well or cistern. This water is used to irrigate a little patch of ground, so

that vegetables may grow in the dry summer. The Bible, which was written in parts of the Mediterranean region, often speaks of wells and cisterns, and tells of watering the gardens.

Irrigation is greatly needed in all this region, but in only a few places is there water enough for a large area. One of these places is at Granada, in southern Spain. Granada is fed by snow water from the Sierra Nevada Mountains. For this reason this old capital of an ancient kingdom in Spain has, for centuries, been famous for its rich crops.

At the mouth of several of the Spanish rivers are famous irrigated sections, such as Malaga, Almeria, and Valencia. Here the skilful Spanish gardeners grow crop after crop of vegetables in the early spring and during the long summer.

In a thousand other valleys, the careful watchers of water irrigate tiny patches of garden vegetables. There are many little patches of irrigated corn, but



Finch & Baker, U. S. Lept. Agr.

Fig. 435. European citrus fruit acreage. Find some places in North America that have the same latitude as the northernmost of these orange groves.

the total Mediterranean crop is only a third as much as in some of our American states. Yet corn is a very important article of food in these countries, because it is cheaper than wheat and is also very nourishing. In all this region corn can only be grown without irrigation on the Atlantic shores of northern Spain and northern Portugal.

In a few favored spots where irrigation is possible, such as southern Italy, Sicily, and Valencia, in Spain, the orange is largely grown. Sicily produces most of the lemons used in Europe and some of those used in the United States.

In the late spring, while the Dutch, the Germans, and the British are wearing overcoats in their damp, raw, foggy weather, the stevedores on the wharves of Malaga, Valencia, Palermo, and Naples are singing under a sunny sky as they trundle boxes of fruit and vegetables on board ships, bound for the English Channel or beyond.

The Po Valley is by far the greatest agricultural district of the Mediterranean world. Like the valley of California, this wide, level plain was filled in by water-borne soils. On the north the valley is walled in by snow-clad mountains, from whose top streams of snow water pour down in summer. This abundant moisture (Sec. 510) on the rich plain of Lombardy (the Po Valley) helps the busy men and women to produce heavy crops of rice, vegetables, corn, and hay.

554. Crops of the dry lands.—Since there is water enough to irrigate only a tiny fraction of the dry land, what do the people grow besides wheat and barley, fruit and vegetables? It is plain that they must have crops that can stand drought. Fortunately, there are many such, among them the grape, the olive, the fig, and the almond. All



Finch & Baker, U. S. Dept. Agr.
Fig. 436. Olive acreage of some of the Mediterranean lands.

of these drought-resisting crops are very important in the California of the Old



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Fig. 437. Picking olives in Palestine. See the rocky hills in the background. How long has this industry been in Palestine?

World, as well as in the California of the New World. These crops can endure drought better than some others, because their large, long roots reach deep into the earth for moisture, and store the nourishment of one year to help make a crop the next year. The writers of the Old Testament often speak of the vineyard, the vine, the vine dresser (or tender), the fig tree, oil (olive oil), and wine.

555. Grapes.—On mainland and island, from the western coast of Portugal to the hills of Palestine, the vine dresser may be seen at work. Vineyards cover a very large part of the land in all these countries. Grapes, one of the chief exports of Spain, may be shipped as fresh fruit, as raisins, or as wine. Wine has long been a leading export of Italy and Algeria. Little dried grapes, which are called currants when we buy them in boxes at the stores, are the chief export of Greece.

556. The olive.—The human body needs some kind of fat as a part of its food. We can get fat from meat, butter, or peanuts, from the rich kernels of nuts, and from oily seeds such as cottonseed. In lands of summer rain like the Mississippi Valley, New England, the north European plain, and England, grass serves to feed the butter-yield-



Photo. Wm. Thompson

Fig. 438. Hauling Spanish cork from the forest.

ing cow and helps to feed the bacon-yielding hog. In such places most of the people eat the fat of animals. But the Mediterranean lands are parched and dry in summer and there is little grass, corn, or potatoes, so the herds of cows and swine are few. Instead of eating animal fats, the people eat vegetable fat in the form of olive oil. Everywhere the gray green of the olive tree may be seen; from Lisbon to Rome, from Athens to Jerusalem, from the edges of the Sahara to the valleys of the Rhone and the Po. In autumn, when the people of Dakota and Manitoba are busy harvesting wheat, and the people of Iowa are busy with their corn, the people of the Mediterranean lands are very busy, too. They are gathering grapes and crushing them for wine; gathering olives and crushing them for oil. Olives are mashed or pounded into pulp and then are squeezed in the olive press.

In some years, Spain actually makes more pounds of olive oil per person than we in the United States make of butter. In central Tunis, on the edge of the desert, where the rainfall is less than ten inches in a year, olive trees cover the plain as far as the eye can see. (Fig. 459.) The French and the Arabs of Tunis are beginning to restore orchards that were very large in Roman times. In those ancient times, tribute-ships crossed the Mediterranean with oil from Tunis and wheat from Egypt with which to feed the people of Rome.

The olive tree is one of the most enduring pieces of property that men can possess. It is said that olive trees which stood in the Garden of Gethsemane in Jerusalem at the time of Christ are still standing there. This is perhaps uncertain, but it is known that olive trees which were planted in Tunis by the Romans before 648 A. D., are still producing fruit.

557. Figs and almonds.—If we had a Mediterranean garden, we should eat figs just as people in America eat apples and peaches. In the villages near the port of Smyrna, on the coast of Asia Minor, Turkish farmers raise quantities of figs, many of which go to New York. Figs are also the chief export from certain of the hilly districts of Algeria and from parts of eastern Spain.

Many of the almonds which we import come from the Balearic Islands and the neighboring parts of Spain. In what parts of the United States do almonds and olives grow? (Sec. 197.)

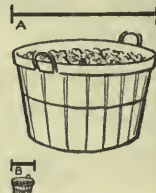
558. Industries moved to America.—Trees and plants can be moved from one part of the world to another part that has similar climatic conditions. It was from the Old World California that the people of our own California received the first trees and vines and seeds of many crops that are now grown in California. We are raising more and more of all these crops which we once imported entirely from Europe.

559. Tree crops on the mountains.—Since trees can thrive in steep and rocky land, if rainfall and temperature are suitable, the Mediterranean peoples have built up a rich tree-crop agriculture on steep mountainsides. Besides the olive, the chief tree crops of the mountains are the chestnut, the cork oak, and the acorn oak, and sometimes the English walnut. The chestnut is the most widespread of all the tree crops. These trees are of choice varieties, and yield

Fig. 439. Bushels of grain produced per person (1911-13):

A. Argentina	34.9
B. Italy	10.2

Does this explain anything about emigration? about the rate of wages?



nuts nearly half as large as an egg. As food, chestnuts are to the Mediterranean mountaineers what corn is to the mountaineer of the southern Appalachians—providing material for bread and porridge, food for animals, and also a crop to sell. Schools are closed during chestnut season, because boys and girls, as well as men and women, are busy picking up the nuts that fall in the groves. For a long time a mountainside chestnut orchard of Spain, France, Italy, Sicily, Sardinia, or Corsica, has sold for as much per acre as the best corn land of Illinois, or for even more.

In all the Mediterranean countries there is much land that is now producing only poor pasture or poor forest, which if put to tree crops would yield several times as much food as it now does. (Fig. 437.)

560. Cork.—Nearly half of the world's supply of cork comes from the forests of oak trees in Portugal, and most of the rest of the cork comes from Spain, Algeria, and Tunis. Cork is the light outer bark which protects the tree from the sun's heat and from fire. A valuable harvest is secured every nine or ten years. Then

the barefooted corkgatherer climbs the tree to strip off the thick bark. Between cork harvests, the shepherd pastures his goats beneath the trees and the swineherd leads his pigs out to fatten themselves on the acorns of the cork-oak tree. Indeed, more than half of the pork of Portugal is produced on acorns, instead of on corn as in America, or on potatoes as in Germany.

561. Animals of the dry land.—The dry climate of the Mediterranean has forced its people to use dry-land animals as well as dry-land crops. The horse and the cow require good pasture or rich hay. Since these foods are scarce in the Mediterranean world, that region is not as well suited to horses, cows, and sheep as it is to goats (Sec. 575)

and donkeys. The goat can live on poor, dry herbage and still give much good milk. In many sections the entire milk supply is furnished by goats. The donkey is kept instead of the horse or the mule. Donkeys, like goats, can live on poor food and climb to rough pasture land.

562. Intensive agriculture.—In the Mediterranean world, the people, in order to get a living, must use their land more fully than we do. In doing this they have in many localities what may be called "two-story farms". This means that wheat, beans, vegetables, and other crops are grown under crop-yielding trees such as chestnuts, walnuts, olives, cherries, almonds, figs, oaks, or mulberries. In the Spanish island of Majorca about nine-tenths of all the cultivated land regularly produces these two sets of crops, one above the other.

We can see how fully Italy uses her land by comparing her with the United States. If the United States had as many people and as many animals to the square mile as does Italy, we should have the same number of swine that we now have, twice as many horses and mules, three

times as many cattle, seven times as many sheep, and *ten times as many people*.

563. The Madeira, Canary, and Azores islands.—These are three groups of small islands in the Atlantic. They are the tops of mountains which long ago were pushed up out of the sea. They are located where the water-warmed winds make the winters warm and frostless and keep the summers from becoming very hot. These islands are even more densely peopled than Italy. The chief income is from bananas, oranges, tomatoes, and early vegetables, which are sent to the north European market in steamers that stop at the islands for coal on the way from South America and South Africa to Europe.

564. The two plateaus.—In the Mediter-



Photo. Keystone View Co., N. Y.

Fig. 440. A shepherd with his flock on the hills of Judea. Name some Bible characters who may have watched sheep here?

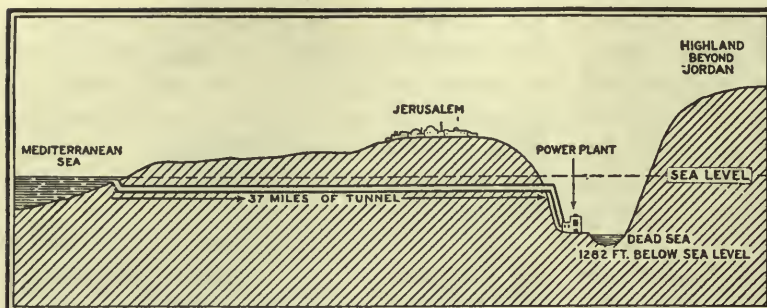


Fig. 441. The plan for one of the longest tunnels and greatest power plants in the world. (Sec. 567.) What will limit the amount of water that can be used?

anean region are two large plateaus where the elevation makes winters so cold that the fruit, wine, and vegetable industries cannot exist. The interior of Spain is one of these plateaus. There the summer is very dry and hot; but at Madrid it is so cold in winter that people can skate, although oranges grow not far away on the coasts of the Atlantic and the Mediterranean. This section has two great products: (1) wheat, and (2) great flocks of sheep that feed on scanty pastures. These sheep are chiefly of the merino breed. (Fig. 627.)

The other plateau, much like that of Spain, lies in Africa, directly across the Mediterranean, in a place where the people look very different indeed from the Spanish (Sec. 546). This plateau, enclosed between the northern and southern ranges of the Atlas Mountains, is nearly one thousand miles long, and from one hundred to two hundred miles wide. It, too, is a land of pastures, parts of which may some day be rich in grain, if the region is used as fully as is Italy.

565. Minerals.—Minerals are an important part in the foreign trade of some Mediterranean districts. The quicksilver mines of Almadén and the copper mines of Rio Tinto, in Spain, have been worked for centuries and are still rich. The town which grew up around our own California quicksilver mines is called New Almaden. Southeastern Spain has many lead mines. On the Bay of Biscay, in northern Spain, is Bilbao, which ships much iron ore to Great Britain. For centuries Bilbao has been so famous for making excellent steel that the

English of Shakespeare's time called the Spanish swords "bilboes."

For a long time the people of Sicily shoveled most of the world's sulphur out of old volcanoes, in which this mineral is always formed. Of late the sulphur deposits of our Cotton Belt have surpassed those of Sicily. (Sec. 49, Fig. 32.) Large

deposits of potash, still unworked, have recently been discovered in Spain.

566. Trade and manufacture.—In the midst of this region the Mediterranean waters furnish one of the great highways of world trade. Each year thousands of ships pass in through the rock-bound Strait of Gibraltar. Other ships pass in and out through the two gates on the east—the Dardanelles and the Bosphorus, and the Suez Canal. To what do these gates give entrance? The Mediterranean Region is poor. It is not a land of opportunity. That is why so many of its people have emigrated to America. It is very poor in cotton, lumber, petroleum, and coal. It has but little water power, except in the Alps and in the Pyrenees. (Sec. 510.) What can a region like this sell when it has a dense population? The scarcity of raw materials and of power shows why the exports of all these countries have been largely farm products, wine, fruits, nuts, and vegetables, all of which are products of the small orchard or garden, and not of the large field.

Ships from America and the Black Sea bring cotton and petroleum, wheat and corn. The ships that come from northwestern Europe bringing coal, machinery, cotton cloth, and manufactures stop on the way home at Smyrna for figs; at Piræus for Greek currants;

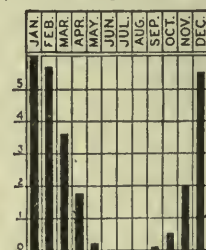


Fig. 442. Rainfall of Jerusalem 25.04 inches per year. Can you tell from this graph why the Bible speaks so often of cisterns, of watering gardens, and of cool water?

at Palermo and Naples for oranges and lemons; at Marseille and Algiers for wine; at Valencia for oranges, almonds, and onions; at Almeria and Malaga for grapes and raisins; at Cadiz, Lisbon, and Oporto for wine.

In the spring and early summer there is much traffic in early vegetables, like the trade in this country from our southern states and California to our northern cities.

In the attempt to find something to sell, the people of Milan make straw hats and in Lombardy and the Rhone Valley they have undertaken the great labor of making silk. This is one of the most intensive uses man can make of land. The Rhone Valley silk has helped Lyon to become one of the leading silk-manufacturing centers of the world.

We shall study more about silk in Japan. (Sec. 664.)

Of late years, Barcelona in Spain, and Turin, Milan, and Naples in Italy have become busy manufacturing centers, and Italy is now exporting cotton cloth, although the manufacturers who do not use water power must pay high prices for imported coal.

Manufacturing is far less important in this region than it is in England, Switzerland, or the Low Countries. A short time ago, Constantinople (Sec. 542), a city larger than Detroit, did not have a single smoke-stack. Many articles that are made in England by the use of machines are still being made by hand in parts of every Mediterranean country.

567. New sources of power.—Any large increase of population in the Mediterranean world must be supported by manufacturing. This requires power, and imported coal is very costly. Perhaps Italy can harness her volcanic forces. In a volcanic region near Florence, Italian engineers have learned to run steam engines with the heat of springs, whose water is made hot by the heated earth. This power is now taken by wire to Florence and other cities, and it is possible that Italy may get much power from the hot earth near volcanoes which have in the past only destroyed lives and property.

Palestine has hopes of a great water-power

plant on the shores of the Dead Sea. (Fig. 441.) The plan is to dig a tunnel 37 miles long from the Mediterranean to the cliffs overlooking the Dead Sea. Since this fast-evaporating sea is below the level of the Mediterranean, the sea water, after flowing through the tunnel, will fall to the level of the Dead Sea, which is a distance of 1292 feet, thus making power for one of the greatest power plants in the world. There is plenty of water in the Mediterranean. All the water of the Jordan may be used for irrigation. How would the drying of the Jordan be a help to the power plant? Power from such a plant might run factories to support thousands of people living within 300 miles, perhaps 500 miles, of the plant. If this project is carried out, Jerusalem may become more prosperous than she was in the days of King David or King Solomon.

QUESTIONS

1. What is the western entrance into this region? Who controls this entrance? Who controls the gateways to Persia? to India? 2. Name the islands of the Mediterranean and tell to what countries they belong. 3. Name some of the cities of the eastern coast of the Adriatic; of its western coast; of the western coast of Italy; of the Mediterranean coast of Spain. Locate Smyrna, Sevastopol, Adrianople, and Marseille. 4. Write out a menu for a dinner you would order in Italy; in Chicago. 5. Why is the Mediterranean one of the world's greatest highways of trade?

6. What kind of grapes get their name from a place in this region? 7. Why is olive oil more expensive to a consumer in eastern United States than cottonseed oil? 8. What is made in Milan from wheat straw? 9. Why are Mediterranean countries unable to produce sufficient wheat to supply all their people? 10. What uses are made of the tree crops of this region? 11. Why may the discovery of potash in Spain be of so much importance? 12. Make a graph comparing the density of population and of animals in Italy and in the United States?

13. Plan a pageant illustrating scenes one would witness as he passed from port to port from the Straits of Gibraltar to the Crimea. 14. What kind of wheat, spring or winter, grows in this section? Why? 15. When was Palestine put under the care of England? Whose name is connected with its deliverance from the Turk? 16. If you could visit only one country in this section, which would you choose? Why? 17. Describe the outgoing cargo on a ship sailing from the Piraeus. Describe the return cargo. Do the same thing for Palermo. 18. Where do you think Italy can most advantageously get her raw material for her cotton cloth? 19. Why have so many Mediterranean people emigrated?

THE GREAT HOT DESERT AND ITS OASES

568. Bounds and appearance.—South of the Mediterranean region is the Sahara, or Great Desert, as the Arabs call it. The desert of Arabia, east of the Sahara, is just another part of the same great desert region and separated from it by a narrow sea.

What is the northern boundary of the desert? (Fig. 445.) The southern boundary is a climate boundary, where the rainfall gradually increases and the desert gradually changes into a land with bunch grass and bushes. Farther south the increasing rain makes a belt of grasslands, reaching across Africa from sea to sea. (Sec. 743, Fig. 552.)

This desert of North Africa and Southwest Asia is one of the largest natural regions in all the world. The distance from the Atlantic Ocean to the Red Sea is greater than that from New York to San Francisco. From the Red Sea to the Persian Highlands beyond the Euphrates is as far as from New York to Chicago. A traveler crossing the desert on his camel might ride for days across bare rocks, from which the hot wind had blown every grain of sand. In other parts of the region he might travel for days across heaps of sand which are always drifting with the wind. The desert is not everywhere the same. In some places the earth is bare; in other places where there is a little moisture, coarse tufts of grass and clumps of thorny bushes grow. Later we shall read about the oases (Secs. 578–582).

569. Climate.—Why is it that Europe is green with crops and forests, while just to the south of it, in Africa, millions of square miles are brown and bare? The winds make the difference. We have seen the effects of the trade wind (Sec. 379) as it blew across the Caribbean, and carried moist winds against the West Indian mountainsides. In Africa this northeast trade wind blows across lowland, and becomes hotter and hotter as it goes toward the equator. This hot wind dries up the moisture from the land instead of giving it moisture. Thus the trade wind makes the Sahara a desert.

Trade winds do this in other continents too. Geographers often speak of "Trade Wind Deserts." (Secs. 776, 857).

570. Summer heat.—The sun heats the dry ground very hot. The air over it becomes so hot that it quivers like the air over a hot stove. The desert Arab wraps thick layers of wool around his head to keep out the heat. He wears a long, flowing robe, or burnoose, made of pure wool. At night he needs this woolen garment to keep him warm. The temperature is often 130° or 140° F. during the day, but there may be frost at night, because the sand cools off so quickly. In our country moisture and clouds at night keep the earth warm just as our clothes keep us warm. By watching the thermometer for a while in winter, you can notice that cloudless nights are colder than cloudy ones.

Traveling in the desert is often done at night, especially if the journey is short, or the traveler does not need to rush on with all speed to reach some distant spring.

571. Rain storms and dust storms.—In the winter the cyclones crossing the Mediterranean bring a few inches of rain to northern Arabia, Egypt, and the northern edge of the desert. No part of the Sahara is entirely rainless, but in some places years pass between showers. Thunder clouds sometimes form (Sec. 71), and rain may fall violently. But often the rain actually dries up before it reaches the earth.

There are wind storms which gather clouds of sand and dust and drop them in burning hot, stifling showers. Sometimes people and animals perish in sandstorms.

572. Desert watercourses and lakes.—It seems strange to think of watercourses being in a desert, but many such are there. On the southern slope of the Atlas Mountains, in some of the highlands in central Sahara, and in central Arabia, streams flow at the time of the winter rains, but soon sink into the desert sands. Some of these streams run every year; some of them run but rarely. The watercourse that passes through the oasis of M'zab (Algeria) has flowed only twelve times in one hundred and fifty years. These



Courtesy American Geographical Society, N. Y.

Fig. 443. A small caravan of camels crossing the desert. What goods may the caravan be carrying?

old water-courses are often the best of roads and may be used in safety for years and years. Then suddenly a cloudburst may descend, turning the road into a raging torrent, which rises like a wall and rushes onward like the wind, overwhelming and sometimes drowning people.

A traveler in central Arabia, speaking of a certain watercourse or "wadi," says: "Never within the memory of man had the wadi been known to flow. But during the summer of 1917 a flood of exceptional violence, descending from the mountains, burst through a barrier of sand dunes that had filled the old channel, and flowed down the long-dry wadi. The governor was seated in the audience chamber drinking coffee with his guests when they brought in the news. 'Bring me a cup and let me drink up this flood,' said he, thinking there was no flood. That evening, the first trickle of water reached Faraa, and for seven days a broad, swirling river flowed through the oasis, reaching a point some miles below its eastern extremity. For several months thereafter a deep and gradually evaporating lake stood

where water had never been seen before. The havoc wrought by this flood was terrible. It completely wrecked many wells and destroyed one small hamlet . . . 150 human lives, 450 camels, and thousands of sheep were lost." Thus many strange and unexpected things happen in deserts.

573. Desert springs.—Through cracks or breaks in the rocks, the water which falls on distant high parts of the mountains comes up in springs at some places along the foot of the Atlas and other mountains, or even far out in the desert. (Fig. 114.) From one spring to the next—sometimes a distance of several days' journey—the caravan travel across this wide, white, glaring furnace. The springs are the stations on their route. The caravan leader must measure his march carefully, for although the caravan is on the move sixteen hours a day, it may cover during that wearisome time only about thirty miles.

574. Desert plants.—Everything that lives in the desert must learn to get along with but little water. The plants have deep roots which reach far down for water. They also have small leaves, so that they do not give much moisture to the air. Some plants grow very quickly when it rains, and then make seed and die.

There are only a few plants, and many of these have a bitter taste, while others are so poisonous that no animal will eat them, or they are so thickly covered with thorns instead of leaves, that no animal can eat them.



Courtesy American Geographical Society, N. Y.

Fig. 444. A village once stood on this hill. See how the wind has blown away the sand and clay until the houses have been undermined. This process is called wind erosion. See the men. What became of the sand and clay?

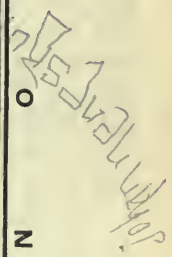


Fig. 445.



Photo. J. Russell Smith

Courtesy American Geographical Society, N. Y.

Fig. 446. A camel eating the tips of a thornbush on the edge of the desert in Tunis. In how many ways is the camel fitted to live in the desert?

575. Desert animals.—The animals are strangely fitted by nature to get along in such a place. The camel is a kind of living storehouse. When he has a chance to get food and drink he takes so much that he adds a hundred pounds or so of fat to his hump. Then for a week at a time he can walk across the burning sands and neither eat nor drink, but each day pounds of fat stored in his hump go into his blood and take the place of food. In order that the camel may eat thorny bushes, his lips are shod with coarse thick hairs that lie flat. To avoid dust, he can shut his nostrils, as we shut our mouths. His eye has a double lid, one of which is almost transparent, so that he can see through it even in sand storms. Instead of a hard hoof, his foot is a wide, soft cushion that spreads out on the sand and keeps his feet from sinking in.

The desert sheep resembles the camel in its ability to store fat, but instead of a hump it has a broad, thick tail that often weighs half as much as the sheep itself. (Fig. 480.)

The donkey, or ass, and the goat are natives of deserts, and, as we found in Section 561, the donkey requires much less food than the horse. Throughout the desert region there are wild antelope and wild gazelles. They do not store food on their bodies in the form of fat, but they can travel for long distances with astonishing speed, and thus escape their

enemies and find food and water. Even the desert man can, like a camel, resist thirst. Many of the Sahara tribes are said to be able to go without water for four days, suffering little discomfort.

576. The nomads.—The desert does not have a clearly defined edge. Instead, it tapers off gradually into a country where there are patches of grass in the low places, and still farther from the desert good pasture lands, as described in Sec. 743.

Here on the edges of the desert live the nomads, people who have only flocks of sheep and goats, camels, donkeys, and a few horses. To get water and food for their animals they drive them from place to place. Many small tribes live by this means. They also buy things here and there, which they carry across the desert to sell. For ages nomads have carried negro slaves across the Sahara, just as the band of Ishmaelites took the little boy Joseph down to Egypt 3000 years ago, and sold him to the Egyptians.

The desert nomads (or Bedouins) have a hard life. If springs dry up and pastures fail, the flocks starve. Then the nomads must either starve or rob, and they rob. In speaking of this custom, an Arab chief once said: "It has been a part of the



Photo. J. Russell Smith

Courtesy American Geographical Society, N. Y.

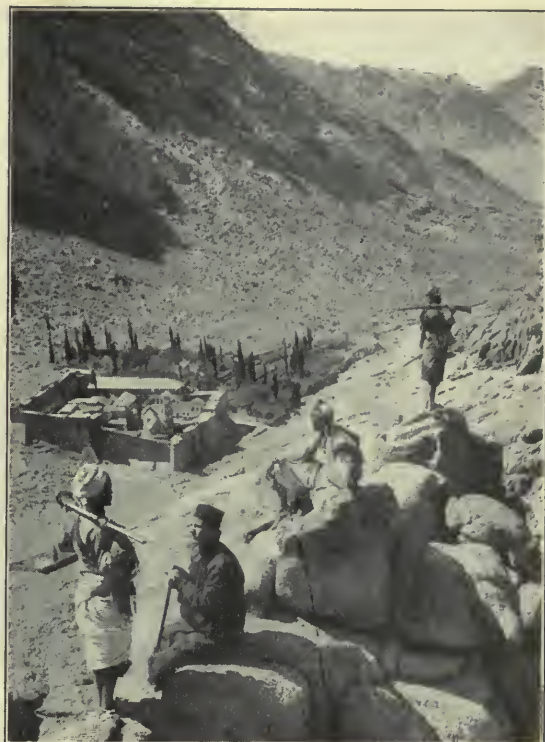
Fig. 447. A Bedouin family and their tent. The man wears a woolen burnoose spun and woven by hand. The woman is grinding barley in a hand mill.

customs and nature of the Arabs from the earliest time to make war upon each other as well as upon neighboring nations. The poor Arab needs a horse so that he can ride to fall upon the goods of his enemy, take possession of them, and grow rich, and the rich Arab likewise needs a horse to protect his fortune and his head." Since the Arab depends so much upon his horse, he has bred a kind of horse that shows more endurance than any other horse in the world.

Why should the nomad's property be only flocks that can walk, and bundles that can be carried on beasts? No desert nomad owns a piece of land. Why should he? Where he wants to pitch his tent, there he pitches it. When he wants to move, he goes. Grass and water are the only things worth having, and he must move to get them.

577. Caravans and signal fires.—Because nomads are such robbers, the traders of the desert nearly always travel in large caravans for protection. To be safe from robbers the Berbers of the Atlas Mountains have built their towns upon the tops of hills, where defense is easy. In parts of southern Tunis these hill Berbers have regularly kept sentinels on high rocks overlooking the village. There, night and day, winter and summer, year in and year out, men for generation after generation have watched, with live coals at hand, ready to start a signal fire. At the first sight of the enemy, the fire would be lighted. Seeing it, the watchman on a distant hill would light his fire, to signal the next lonely watcher. Thus the news of danger would be passed from village to village, until all were called to arms. Even a city like Sfax, on the coast of Tunis, still has a solid stone wall higher than the houses, and all the people were living inside of the wall when the French took possession in 1881.

The Bedouins can rarely read, but they have good memories and know many stories such as those in the book called *Arabian Nights*, which they tell around the camp fire, and thus pass them on from generation to generation and from century to century.



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Fig. 448. A monastery a thousand years old built around a spring at the base of Mt. Sinai. Why is this monastery walled and the country so bare? The trees in this picture are said to be one thousand years old.

578. The sand oasis of Suf.—In the northern Sahara a traveler may leave one of the oases and cross about sixty miles of waterless, wave-like sand dunes, which spread before him like the waves of the sea. After many hours he beholds a dark green spot in the white sand. It is the tops of palm trees in the oasis of Suf. Long ago plants growing here showed the Arabs that there was moisture beneath this sand. This discovery made the place gradually become the home of thousands of people. Because date palm trees can send their roots through many feet of earth to reach moisture in the ground beneath, date gardens can be made to flourish in some places where there are no surface springs or streams. These trees are capable of supporting many people. When a palm garden is to be planted, the people dig a wide pit eight or ten yards deep. In this pit the trees are planted. Because the sand dunes move before the



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Fig. 449. A Bedouin woman milking her goats in the kingdom of Hejaz. Why does she not have a cow?

wind, sand would soon bury the palm trees if the people did not prevent it. This they do by carrying the sand in baskets out to the desert, where they dump it in piles. Each day the wind blows some of it back and so, from childhood to old age, the Soufas are tugging baskets of sand out of their little date gardens, and piling it on the surrounding sand hills. This awful labor reminds us of how the Dutch pump water out of their land; but carrying sand is a much harder job, because the Dutch get the wind to do their lifting (Sec. 441).

All the people of Suf live in stone houses beside their palm gardens. Camels, goats, and sheep can find a scanty living in the damp places between the dunes. So the people have wool and milk. Why are they not nomads?

The eyes of these people are trained in a most astonishing way. If a Soufa wants to get his camel, he will go to the place where he last saw it and follow the pad foot tracks across the sand. He can tell the track of his own camel from that of his neighbor's

camel. One of us could scarcely tell the difference between a camel's track and that of a horse.

579. The oases with wells.—In another part of the desert west of Suf, most of the surface is bare rock, in which water from occasional rains has cut such a network of channels that the name of this region is M'zab, meaning in Arabic, "the net." The valleys are full of earth, and beneath the earth there is water, but it is too far down for even the roots of the palm trees to reach it. By irrigating the oases with water lifted from wells, thousands of people, called Mozabites, live here. The water is drawn up in big leather buckets that are fastened to the ends of ropes. A rope passes over a pulley at the top of the well and runs thence to a donkey or a camel (Fig. 450). As the beast walks away from the well, he draws the leather bucket up to the top, and the water is dumped. It then flows away to the gardens through a carefully lined channel. If the wells yield water all the time, the privilege of using it is sold, and all day and all night one can hear the creaking of the pulley, the yells of the donkey driver, the thump of the beast's feet, and the splash of the water as it falls from the bucket. The labor is hard, but the Mozabites, like the Soufas and the nomads of the pastures, are big strong men.

580. The oases with springs and small streams.—In most of the many hundreds of oases of the Great Desert, living conditions



Fig. 450. A donkey pulls the rope and lifts water to irrigate an oasis garden. A garden here means work.



Photo. J. Russell Smith

Fig. 451. The entrance to an oasis in Tunis. Here you see date palms, a fig tree at the right, and the stream that makes the oasis. The water is flowing across a log with notches in it. A man counts his fortune by the width and depth of his notch in the water-measuring log. Why is the house built outside of the oasis?

are easier than at Suf and M'zab, because the water comes from flowing streams which the people can turn into their gardens, thus giving the date tree what the Arabs say it wants: namely, "its feet in the water and its head in the fires of heaven." The date gardens yield crops year after year, century after century. Some oases are known to have been yielding steadily since the time of the Romans. The date garden yields twenty times as much food as a wheatfield of the same size.

581. Three-story farming.—Because much food is needed in these oases, the people have developed a wonderful system of agriculture. Beneath the tall open topped date trees are smaller trees, such as apricots, olives, and oranges. Beneath these trees vegetables are grown. This three-story agriculture yields so much that a tiny patch of ground will support a family. Arabs will sometimes pay at the rate of \$5000 an acre for a bit of oasis land with palm trees on it.

The villages, which are always on the desert beside the oases, swarm with people

who are busy in the early morning and in the late evening working their gardens, carrying water, and milking the goats. At noon the settlement is as quiet as death, because everyone sleeps during the heat of the day.

582. Mysterious Arabia.—Much of Arabia is still unexplored. Since Roman times only two white men are known to have crossed Arabia from the Red Sea to the Persian Gulf. Between the tropic of Cancer and the Arabian Sea is a strip of land which the Arabs call the "Empty Quarter," because it is entirely uninhabited for most of the year. In central Arabia, however, there is a plateau, and its greater elevation causes more rainfall. Many streams flow down its slope. Once these streams ran together and made a river which reached the Persian Gulf, but this was ages ago. Now all streams are lost in the sand a short distance from the plateau. But immediately at the foot of the plateau there is a strip of land four hundred miles long and twenty miles wide, where every little valley has an oasis or two. Some of the



Fig. 452. Cultivated land in Egypt follows the Nile. Why?

oases are so tiny that there is room for two or three trees; others are five or ten miles in length and their trees and gardens support thousands of people.

583. An independent town.—One of these many oasis towns lies with its springs in a little valley entirely surrounded by a waterless plateau, yet it has 10,000 people. The town is absolutely independent. About the year 1900 the governor

of central Arabia sent a tax gatherer to collect taxes from the town. The people whipped him publicly and drove him away. The governor could not attack the town because it contained too many people. If he had tried to besiege it, he would have had to camp out in a desert where there is no water. This shows why the Turks, who have claimed to rule Arabia, have really ruled only a rim around its shores. They have never been able to rule the vast, mysterious inland territory.

584. Camping in the Empty Quarter.—At the end of the rainy season the nomads along all the desert's edges often go into the desert and live for a short time in places where they could not possibly live all the year. At this time the oasis people living at the south end of the central highland of Arabia often make a trip into the Empty Quarter. The water of the springs is so salty that men cannot drink it, but camels can. The camels, after pasturing, must return to the springs to drink; so the people camp by the springs, and milk the camels when they return for water. Camel's milk, dates which they bring with them, the flesh of gazelles, and other game furnish food for the desert camp. At times these people cross the eight hundred miles of the Empty Quarter to raid the tribes on the shores of the Red Sea, but no white man has ever been known to have gone with them.

585. Yemen and Mocha coffee.—A small part of southern Arabia, called Yemen, has a high mountain facing the Red Sea. This section receives enough rainfall to grow Mocha coffee, and a grain somewhat like Kafir corn. Mocha coffee is one of the most expensive coffees in the world. It was from this region that the people of Europe first received coffee.

The agricultural district of Yemen is so small and precious that the people have terraced their hillsides like steps, thus making more garden land on which the rain can fall.

586. The great rivers and the great oases of Egypt and Mesopotamia.—In two places large rivers, rising in distant lands of heavy rainfall, carry their great waters into the heart of the desert and on across it. Thus the broad plains of Egypt and Mesopotamia can be irrigated. They are the greatest oases in all the world and support millions of people.

587. Egypt—the world's greatest oasis.—In Egypt (population 13,000,000) there are more people than can be found in all other oases and all the nomad camps combined. The Nile, called by the natives "Father Nile", rises in the rainy parts of Africa and carries water across the entire width of the



Photo. Wm. Thompson

Fig. 453. Arab women traveling in Egypt; the veils are worn in Mohammedan style. Donkeys carry most of the burdens of Egypt. Note the carved screen.

desert. This river alone makes the great oasis called Egypt. Once each year the waters of the Nile rise and overflow its banks. (Sec. 763.) The water spreads over the plain along the lower courses of the river and in the delta. When the flood begins to go down, the natives of Egypt walk out into the pools of water to sow the seeds of wheat and barley and a native grain called durra, which is much like Kafir corn (Sec. 108). The seeds fall into the water, settle in the mud beneath, and when the water has gone, the plants, fed by the moisture of the soaked earth, grow rapidly, and ripen their harvest in the blazing desert sun. For thousands of years grain has thus been grown in the Nile Valley.

In twenty-five years the Nile builds up its plain only about one inch, but that is enough to keep it yielding one fine crop after another, thus feeding millions of big, strong, good-natured black people, called fellahs, or fellaheen (Fig. 454).

588. The native Egyptians.—These natives have been ruled first by one foreign conqueror, then by another. No matter who ruled them, the fellaheen have for centuries lived much as they do to-day. Thousands of years before Christ, lordly tribesmen from the North took possession of the Nile Valley. Those ancient conquerors wanted to erect tombs for their kings, so they built the huge pyramids. For this great work they used thousands of slaves and thousands of camels, but just how they managed to put the great blocks of stone in place is not known.

Enormous pillared temples built by these ancient Egyptians still amaze us, as do their writings in stone and on the sheets of papyrus, the pith of a reed that grew by the Nile.

589. Native life and native farming in Egypt.—To-day, as for several thousand years, the traveler sees flood-plain and delta dark green with heavy crops. Here and there a few tall palm trees stand on little mounds of earth a few feet above the flat plain. On the mound is a village of brown mud huts. The simple house has walls of sun-dried brick, set in mud. The roof is only a few rafters covered with straw, or



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Fig. 454. Natives lifting water up the bank of the Nile. Each man pours his bucket of water into a pool behind him until the last man pours it on the edge of the field, where it flows to the roots of the growing plants. Many men are needed for even a small field. Suggest a better method of lifting the Nile's waters to the field.

palm leaves, and plastered on top with mud. There is an opening that serves as a door, but there are no windows at all. Inside are a few sleeping mats, a few earthen vessels, a hand mill to grind grain for bread, and a few yards of cotton cloth from Manchester. Such is the home of the man who plows the fertile plain with a crooked stick drawn by oxen. His methods have not changed from those his ancestors used before the time of the Pharaohs.

590. Modernizing Egypt.—Of late years, under the rule of the English, even Egypt has begun to change. The age of machinery and engineering has begun in Egypt. Railroads and telegraphs have been built. Egypt has become prosperous because the people can now grow a crop and sell it and get the money for themselves, instead of having it



Fig. 455. The city of Cairo. The towers show the educated Arabs' sense of beauty. From these towers the Mohammedan priests call people to prayers.

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taken by a robbing tax-gatherer. Never before did Egypt produce so much wheat, corn, rice, durra, and sugar cane. Her swarming people eat most of these products, but they export some early vegetables.

There are fields of clover for the donkeys and camels, and there is cotton to sell. It has been found that Egyptian cotton is the best cotton of all. Its threads are longer and stronger than those of other cotton, so we use much of it for automobile tires. During the World War the price of cotton was very high, and Egyptian cotton growers made so much money that they bought automobiles as American farmers do.

After all, Egypt is a very small place in comparison with our own Cotton Belt. Her cotton yield per acre is greater than ours, but her total crop is only about one-eleventh as large as that of the United States.

591. Cairo and Alexandria.—The Egyptian capital, Cairo, is the metropolis of the oasis world and the largest city of Africa. It is at a crossroads. Here the Nile Valley reaches the Mediterranean, the Isthmus of Suez makes a bridge to Asia, and the Suez Canal (Sec. 610) provides the great shipway from Europe to the Far East.

Cairo has more people than St. Louis or Boston. It has become a great center for European and American tourists who want to make a winter trip in search of health and recreation. Here the traveler sees a real Mohammedan city, full of men of many nations. Near by are the ruins of many ages; in museums are collections of Egyptian curiosities and works of art.

Alexandria, the Nile port, has more people than New Orleans.

592. The Assuan dam.—

Because Egypt has over a thousand people to the square mile, more land is needed. The English are turning desert into farmland by making new irrigation works. At Assuan on the Nile they have built a great storage dam. It holds back some of the flood waters so that the water may be carried in canals to lands which natural floods do not reach. Thus England is increasing the area of Egypt's fields, but the yield is not so good as that of



Courtesy Wm. Thompson

Fig. 456. Native Egyptians selling lemonade in the streets of Cairo.

the lower plains, because this water, unlike that of the floods, does not carry the rich mud.

The English are pleased with the success of the Assuan dam. They plan to copy the example of Holland and drain the shallow, salt lakes or bays at the outer edge of the Nile delta, and irrigate them with the water stored in dams a thousand miles upstream.

593. Mesopotamia, the oasis of the Tigris and the Euphrates.—These two rivers, fed by the winter rains and melting snows of the mountains of Armenia, flood thousands of square miles each year. Like the streams of California (Sec. 194), they have partly filled a great arm of the sea with earth. Even in historic times all that part of the plain below the junction of the Tigris and the Euphrates has been built by the two mud-bearing rivers. The streams wind back and forth across this plain much as the Mississippi and Rio Grande do in their flood plains.

This valley shares with the valley of the Nile the honor of being the seat of early civilizations and the site of many changing empires. To-day many things which are new to this locality may be seen there. If we ride about in an automobile, we may see English army airplanes flying overhead. We pass a string of auto trucks which are stirring up a great cloud of blinding dust as they speed along, carrying supplies to the garrison. These modern machines, the airplane and the automobile, have not replaced the ancient burden-bearers of the East, for we see strings of camels shambling along the road, and carrying bales of goods down from Persia to a steamboat landing on the Tigris. A donkey plods along almost buried beneath his huge load of straw stuffed into a rope net; his mean looking Arab master stalks



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Fig. 457. Arabs and their "ships of the desert" before the Sphinx and the pyramids, near Cairo. These are among the most interesting of the many monuments of the past. Ruins tell us how the ancient Egyptians lived.

behind, yelling loudly as he clubs the strong little beast. Looking in one direction, one sees the bare, dry desert; in the opposite direction, on the river's bank, is a fringe of palm trees and gardens, watered by natives who laboriously lift the water from the stream (Fig. 454). Everywhere the earth seems filled with pieces of broken pottery and old bricks; near by, great arches and gateways mark the entrance to ancient cities that are now only mounds of ruins. Digging in the side of these mounds, one will see one pavement above another with several feet of dirt between, showing that cities have been built, ruined, buried, and others built on the same site. Close by is an ancient empty canal built by King Nebuchadnezzar to irrigate this plain.

Since the World War, this valley with a population of three million people, has passed to the control of England, and modern industry is busy making another Egypt of it. Even under the Turks, steamboats went up the Tigris from Bassora to Bagdad, and ocean steamships carried from Bassora to New York nearly all the dates that we used in this country.

Europe looks to these two hot valleys for a quick supply of cotton fiber, which is so im-

portant for the world's clothing and industry. But these valleys cannot furnish all the cotton that Europe needs, because there is not enough land that can be irrigated.

594. Other resources.—There is oil (petroleum) at Mosul, in the upper part of Mesopotamia. (Fig. 445.) This may make great business as long as the oil holds out, but we know it cannot last many decades (Sec. 301).

It is strange, but the desert has fishermen. They live on the shores of the Persian Gulf, go out in small boats, dive down into the shallow waters, and bring up in their hands oysters, inside the shells of which pearls are found.

595. Government.—We have already seen (Secs. 590, 593) that Egypt and Mesopotamia are ruled by the British, who let the natives rule themselves as much as they can. During the World War the British promised the Arabian Arabs that if they would help against the Turks and the Germans, they could have a kingdom of their own. This kingdom is called Hejaz, and the Arabs plan to let no one but a Mohammedan enter it. It contains the sacred city of Mekka, the birthplace of Mohammed, to which all Mohammedans who can will make a journey once in their lifetime. The King of Hejaz will probably have no better success than the Turks in ruling central Arabia. (Sec. 583.)

Libia (Fig. 10) now belongs to Italy, and most of the Sahara belongs to France, but the nomads of the Sahara and the people of the small oases may be said almost to rule themselves. The French soldiers do not interfere much unless the natives fight or rob.

596. Future development.—Much of this enormous region that stretches over the whole width of one big continent and occupies a large corner of another one will remain as it is now, a dead desert. Great changes can be expected in the two big oases, Egypt and Mesopotamia, where as long as there is water in the rivers, there is a challenge to man to find a way to use it.

In any case, Mesopotamia is not likely to be a white man's land. It is too hot. An American traveler, speaking of the British army in Mesopotamia, said: "Through the months of gasping heat when from eight to five no soldier is supposed to do any work and even the animals do nothing, when people must wear helmets made of cork, and spine pads made of wool all day, when men out in the blue lie pantingly in their tents longing for night to come, the most important piece of knowledge is the location of the heat-stroke station."

Now that we know how to build railroads in almost any kind of a place, the discovery of minerals may make a busy town almost anywhere in the Great Desert. In Tunis thousands of nomads have quit following their flocks, and have moved into the towns of tin shanties and sundried brick built around certain phosphate mines that are sending more than a million tons of phosphate rock a year to feed the fields of Europe.

In the little oases the native, by hard work, is often using every bit of water in raising crops. In some places on the edge of the desert it is



Fig. 458. The arch of Ctesiphon, near Bagdad, Mesopotamia. Inside the arch was the great hall of an emperor. This is a part of one building in one of the several large cities of ancient Mesopotamia.

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possible for olives, and perhaps for other tree crops, to bring agriculture where now there is only pasture (Fig. 459). However, life at the desert's edge must always remain uncertain, as the lost civilizations of the Syrian desert show.

597. A lost civilization.—Between the Jordan River and the upper Euphrates, the desert is sprinkled with the ruins of villages and houses, which show plainly that it once had a greater population than any part of

the United States or England outside of the great cities. We know that this region is at least twice the size of Maryland, although no one has yet traced all its limits. Historians know that it was populous when the Old Testament was written, and that it was in the height of its prosperity from the time of Christ to 600 A.D. The ruins of olive presses and wine presses prove that it was a land of the vine and the olive tree, as the Mediterranean world was then and is to-day. The ruins of the villages show that the people lived in comfortable stone houses. Inscriptions on the buildings show that wealthy citizens left public baths, monasteries, churches, and other gifts to their towns. In the year 610 A.D. this territory was conquered by the Persians. Soon after that it was conquered by the Arabs. Misgovernment helped to ruin it and so did erosion. Bare fields were washed into gullies until only rock remained. To-day this great region is a marvelous and desolate scene of the ruins of ancient glories, and a warning to us about our own civilization.

QUESTIONS

1. Locate the Great Desert by stating its position in the continents. How long is it? How wide? Use scale.
2. Name some of the desert plants. Compare the plants of the desert with those of the Arctic regions. In what respects are they alike?
3. Which do you think is the most interesting animal of the desert? Which would you rather own? Why?
4. The camel has been called "The ship of the

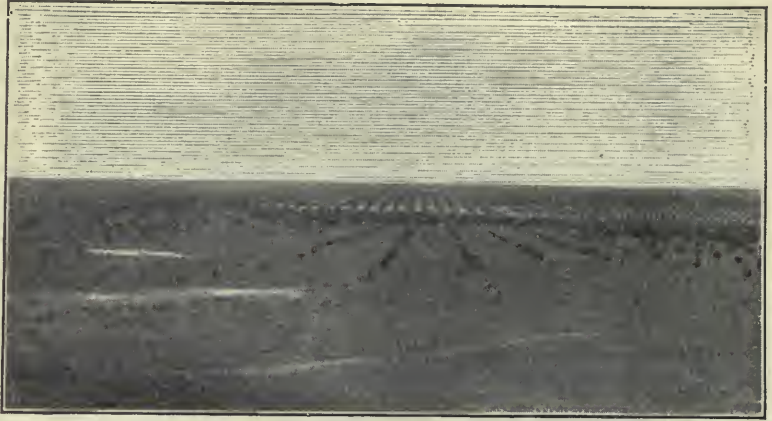


Photo. J. Russell Smith

Fig. 459. View from a tower near Sfax, Tunis, where the olive orchards reach in all directions as far as one can see. Yet the total rainfall in five years was only 35 inches.

desert". Do you think the comparison a good one? Give your reasons.

5. On the physical map of Africa locate the sources of the Nile River. In what regions of Africa are these located? How can you account for the great amount of water fed into the Nile? Describe location and direction of flow of this river.
6. What causes the falls in the Nile?
7. What effect do these have on transportation on this river?
8. Explain the flood plain of the Nile. Explain the delta.
9. Compare farming in Egypt with farming in some part of the United States.
10. Locate and describe the Tigris and Euphrates rivers. Can you find any interesting stories connected with the histories of these rivers?
11. Where is Mt. Sinai?
12. Why does the monastery in the picture (Fig. 448) look like toy houses?
13. Which do you think would occur most frequently—a rain storm or a sand storm? Why?
14. What damage is done by sand dunes?
15. Give some reasons why you would like to travel across the desert, and some of the hardships of such a trip.
16. Which would you rather own, an acre of date oasis or an acre of American farmland? Why?

17. Explain how the northeast trade wind is the cause of the Great Desert.
18. Why do the trade winds bring rain to the West Indies and dry weather to the Great Desert?
19. Why are they called northeast trade winds? (Sec. 364.)
20. Locate and describe the important cities near the Nile.
21. Locate the most important seaport. To what country does it belong?
22. What is there in the picture (Fig. 455) that would make you know it was not an American city?
23. Why do we import cotton from Egypt?
24. What is meant by a nomad?
25. Compare the nomads with the Indians of North America.
26. What do the ruins in Fig. 458 tell about the kind of people who once lived there?
27. Imagine that you are traveling with a caravan across the Great Desert. Write an account, which you might place in your diary, of the experiences of a day on the desert.
28. Dramatize from the Bible the story of Joseph. Study the text carefully to see that you make everything in harmony with facts of desert life.



U. S. Official Photograph

Fig. 460. The city and fortress of Kars, Armenia. Can you tell anything of the history and climate of this country by looking at this picture?

29. What other deserts have you already studied? Compare them with the Great Desert as to location, size and cause. 30. If you were planning to visit the Great Desert, to what city would you sail? Tell how you would travel—over what lands and bodies of water. How long would your journey take? 31. In what other part of the world have we found dry watercourses? 32. Compare the climate and surface of such a place with that of the Great Desert. 33. The temperature of the desert is often 140° F. during the day, but there may be frost at night. Why? Give two reasons. 34. What is the value of land in your community? How does this compare with the price which is stated as the cost of some oasis land? 35. The Egyptians worshipped the Nile River. Can you tell why? 36. Man's greatest need is food. The earliest peoples lived in food-producing regions. How then can we connect ancient civilization with this desert region? 37. Write a play, "Scenes in the Desert"; plan scenery, costumes, and acting, true to desert life.

THE PLATEAUS OF ASIA MINOR AND IRAN

598. Bounds and climate.—On all its shores the plateau of Asia Minor rises abruptly from the sea. What are the seas? (Fig. 469.) Its continuation, the plateau of Iran, also rises abruptly from two seas and three low plains. What are they? (Fig. 474.) From the western end of this plateau one may travel on a highland for twenty-five hundred miles across Asia Minor, Armenia, Persia, and Baluchistan, until at last one looks down upon the dry lowlands of the Indus valley.

This high dry region is larger than all of the United States west of the Rocky Moun-

tains. Even the peninsula of Asia Minor is longer than the distance from Lake Erie to the Atlantic Ocean. We can best understand this region by thinking of it as another Utah and another Southwestern Plateau, both of which it resembles in climate, surface, appearance, and products. As in Utah and Mexico, we here find a few cities in a dry, high land, depending for water upon streams from the mountains. The city of Teheran is at an elevation of 4000 feet, Hamadan at 6000 feet, and

near both cities rise still higher mountains. (Fig. 474.) As in the southwestern United States, high mountains shut out the rain-bearing winds, so that the plains between the mountains are often deserts where mountain streams sink into the sands or flow away to salt lakes, as in Utah and Mexico.

The mountains of Armenia, which are higher than the Alps, stand upon this plateau. Mt. Ararat is one of these famous peaks. Streams fed by rain and melting snow flow from these mountains into the rich Mesopotamian plain. Thus the plain has been able to support the empires of the past. (Fig. 458.)

599. Plateaus of hate and despotism.—This region has many different peoples, and for a long time they have got along very badly indeed with each other. The Turks are in western and central Asia Minor. The Armenians are in northeastern Asia Minor. South of the Armenians are the Kurds, and north of the Armenians are the Georgians and Tatars of Azerbaijan. East of the Armenians are the Persians and the Baluchis. Arabs with their flocks and herds are scattered in many parts of the plateau. All of these peoples have often fought each other fiercely for land and water.

The Armenians especially have had a bad time of it. They were civilized people three thousand years ago, and have one of the oldest of the Christian churches. They live in

a country where the other people keep flocks and herds and till the soil. The Armenians do these things, too, but in addition they are skilled artisans and traders. Because the Armenians differ from their neighbors in race and religion, and are better business men than their neighbors, they are hated. The Turks to the west and the Kurds to the south have often massacred Armenians by the thousand. Of the seven chief peoples, the Armenians, the Georgians, and the Persians are dark-haired white people. The others are black-haired, yellowish-skinned peoples.

Before the World War, four nations ruled or pretended to rule this region. Russia ruled all the land between the Black and the Caspian seas; the Turks claimed all the rest that lay west of Persia; the English ruled the wild tribes of Baluchistan; and Persia was independent. Like the Armenians, the Persians had an empire long ago; but for a long time the Persian shahs, or kings, have ruled almost as badly as have the Turks themselves.

600. The jealousy of European countries has hurt this region, as it has hurt the Balkans. (Sec. 524.) No nation has interfered when Turks have killed Armenians in Asia, because each nation feared the other



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Fig. 461. Harvesting wheat by hand in Asia Minor.



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Fig. 462. Viewing the Gulf of Smyrna from a mountain ridge. What kind of trees do you think you see as you look down on the shore plain? (Sec. 557.)

would get the Turkish territory. Jealousy of European nations has also kept railroads from being built in this region.

601. **Trans-Caucasia.**—The land between the Black and the Caspian seas is called the Caucasus and Trans-Caucasia. Many tribes inhabit it. All were conquered years ago by Russia. Then Russia built a railroad from Batum on the Black Sea through Tiflis, the ancient capital, to Baku on the Caspian Sea. At Baku, near the east end of the Caucasus Mountains, is one of the great oil fields of the world. For hundreds of years this place was visited by fire worshippers from Persia, who made the long pilgrimage to visit the natural fires that burned in the rocks where natural gas escaped. Now, instead of fire worshippers, oil workers go to Baku. The place bristles with the derricks of oil wells, and many thousands of Georgians, Tatars, and Russians are at work there. For many years this region was second only to the United States in oil production. Oil is taken nearly six hundred miles by train and by pipe line to Batum, where ships load it for Europe.

602. *Living the life of the ancients.*—There are few railroads in Asia Minor, and almost none in Persia. In this country, 800 miles wide and 1300 miles long, people are living almost as they did 1000 or 2000 years ago. In fact, the roads were better 2500 years ago when Persia was a great empire than they were in 1914. At the opening of the World War, except for a few miles of railway and a few wagon roads, all travel was by the backs of horses, camels, or mules. All trade was by caravans which climbed high mountains and crossed dreary desert plains. If the traveler could find an inn he was fortunate. Even then he must furnish his own bed and food, as is the custom at Persian inns.

603. *Agriculture.*—This plateau is a land of little rain. In some localities there is rain enough over small areas for wheat and barley. Near some of the mountains, as in Utah and the Mexican plateau, water may be had for irrigating small areas. These precious spots are used intensively. Rice is grown where there is water enough. Where water is less plentiful, there are rich gardens in which vegetables are grown beneath fruit

trees. People who need more land so much, usually grow fruits and vegetables together. We also see the intensive use of land in the production of opium, of attar of roses, and of silk. These products require little land, but with much labor they yield large cash returns.

The wheat and barley cannot be sent far on muleback to market. Therefore each locality must raise its own supply. Sometimes more is raised than can be used. Then the price is low. Again, in bad seasons, less is raised than is needed, and the price is high.

The price of needful things is always affected by the quantity to be had. This is especially true in places like this region, where the people have no opportunity for world trade. This interior district, which is almost without railroads, supports over 200,000 people in Teheran and as many more in Tabriz. Salt Lake City has 117,000 people.

Much of the world's licorice is made of the extract from the root of a wild bush that is dug up by the people of Asia Minor.

604. *The nomads.*—As most of this wide upland, like our own Southwestern Plateau, is fit only for pasture, nomads are to be found in almost every part of it. The total number of nomads in Persia is estimated as a million and a quarter. Compare that number with the population of the four states of Arizona, New Mexico, Utah, and Nevada. The Kurds of Kurdistan are almost entirely nomads. These nomads have about as hard a time of it as do those who live in the desert of Sahara itself, for on the plateau there are sometimes heavy falls of snow which cover the grass. Men and animals sometimes freeze to death in the snow. Poverty and suffering encourage these people to be raiders and to plunder their neighbors.

605. *Manufacture and trade.*—A region almost without coal, water power, railroads, or good highways cannot use machinery as it is used in the factories of Europe and America. The Armenians and Persians, like the craftsmen of ancient times, work by hand, and are very skilful. They make



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Fig. 463. Children weaving a Persian rug. To the thread of coarse net-like linen cloth, a short piece of woolen yarn is tied, then another and another, until finally thousands stand close together. When the network is full the ends of the yarn are clipped off evenly, and often the ends stand up solidly as much as half an inch.

beautiful metal work, and their firearms and other weapons are often inlaid with lavish designs in gold, silver, and pearl.

The most wonderful and expensive rugs in the world come out of this plateau. These rugs, together with other valuable exports of silk, furs, wool, and skins, go for long distances to market on the backs of pack-animals. When sold they pay for the im- port of cotton, sugar, tea, kerosene, and small manufactures.

606. Future.—This region, which has more people than Canada, is ready to enter the age of transport, machinery, and trade, if only it can have peace and order. Then man could work and build and be sure of keeping his property after he has acquired it. The people are poor but willing to work. If this region has a chance, one of the first things produced will be minerals. It is rich in iron, copper, zinc, and manganese. Coal is also found. There are promising oil fields on the south shore of the Caspian and in southern Persia. Even before the World War, there were railroads in the Trans-Caucasus, and, as a result, hundreds of ships sailed each year from Batum and Poti, with oil for Europe and manganese ore for the steel mills of England, Belgium, and Germany. Some of the ore came even to the United States. This is only one example of what railroads may do here.

In many a mountain defile in this long plateau there is room for irrigation reser- voirs such as we are building in our own country, but first peace must come. When this land really enters the world's trade it will send its goods out by the four seas that touch it. The Caspian, with the great river Volga, gives Russia a fine chance to trade with Azerbaijan and north Persia, while the Persian Gulf and the British possession of Mesopotamia give Britain, with her ships, an open road to southern and western Persia.

QUESTIONS

1. Why do England and Russia both covet pos- session of Persia? 2. Compare the occupations in this region with the occupations of people in Utah. Why the difference? 3. Locate Teheran, Bagdad,



Photo. Keystone View Co., N. Y.
Fig. 464. Persian charcoal merchant on the way from mountain to market. Why do not the people burn coal?

Erzerum, Batum, and Tiflis. 4. Compare the life of the nomads of this region with that of the nomads of the Great Desert. 5. What advantages would there be in going into this region to live? What dangers? 6. What are the advantages for manufacture possessed by this region? The disadvantages? 7. Fill up the chart:

TOPIC.	TRIP FROM BASSORA TO TEHERAN.	TRIP FROM THE HAGUE TO MOSCOW.
Mode of travel.....		
Hotel accommodations....		
Temperature(Figs.328,329)		
Rainfall.....		
Nature of country.....		
Streams crossed.....		
Cities you would want to visit on the way.....		

8. What conditions have produced the high de- velopment of rug-making in Persia? Look up the prices of these oriental rugs; stories of their making; pictures of their colorings and design. 9. What has been the effect of wars and of jealousies of nations upon this region?

**THE TRADE OF EUROPE AND THE
MEDITERRANEAN WORLD**

607. Likeness of North America and Europe.—We found that the greatest trade in North America was carried on between the densely-peopled factory area in the northeast, and the food and raw material areas of the north, west, and south. In Europe and the Mediterranean world we find a similar ex- change of goods. Where are the raw material areas? (Figs. 319, 467.)

608. The easy routes of Europe.—Look at the maps (Figs. 14, 319) and explain why it



Fig. 465. The harbor of Hamburg showing ships, harbor boats, river boats, and warehouses with cranes for lifting freight. Name three cities (Fig. 385) these river boats may serve.

© Keystone View Co., N. Y.

is easier to trade in Europe than it is in North America. Show how Europe can have two sets of routes: (1) the water routes for heavy freight, such as grain, ore, iron, and wood; and (2) the railroads for express, mail, and passenger traffic. Why are several nations anxious to control the straits of Gibraltar and the Bosphorus?

Except in Russia, the European railroads run many fast trains, which are nearly always on time.

609. Travel centers and connections.—The greatest European railroad centers are London, Paris, and Berlin. Express trains leave London and connect at channel ports with boats that run across the channel like ferries, taking the traveler by one of several routes to Paris. From Paris the traveler may go to Madrid, Marseille, Geneva, Rome, and Naples; or he may take the Oriental Express to Vienna, Belgrade, Sofia, and Constantinople. Across the narrow Bosphorus is the great terminal station that was built by the Germans at the end of the Bagdad road. On this railroad the traveler may cross part of Turkey in Asia. The line is planned to reach Bagdad, where he may take steamboat

passage to Bassora near the head of the Persian Gulf. Doubtless a railroad will some day go on from Mesopotamia to India.

From London a traveler going eastward may take boat for Rotterdam. From that city he may proceed by train to Berlin, and at Berlin three main routes spread out: one northeastward to Petrograd and Finland; one southeastward to Breslau and Odessa; and one eastward to Moscow and Siberia. From Moscow a line goes south to the oil fields of Baku at the eastern end of the Caucasus, and another goes through Orenburg, past the shores of the

Aral Sea, far into central Asia. The main line crosses Siberia to Vladivostok, and when the road is in working order it is one section of the quickest route around the world.

610. The Mediterranean and the Suez Canal.—The Mediterranean and its arms make a most useful natural route, but men have made it a still greater route by building the Suez Canal. The waters of the Red Sea came so close to the Mediterranean that men carried freight across the narrow, level, sandy isthmus for several thousand years. Even in Pharaoh's time a small canal was there, but it became filled with desert sand. When steamships came into general use, there was much more freight to be carried across from one sea to the other. Thousands of camels then labored back and forth shifting cargo from Port Said to Suez.

When the French engineer De Lesseps finished the Suez Canal through the desert isthmus, he enlivened the trade between Europe and Asia. Especially did he wake up the cities of the Mediterranean and South Europe. Algiers, Malta, and Port Said became great coaling stations. So did Aden, although it is in a place so dry that even

the drinking water must be condensed from sea water. The traffic through the new canal built up Genoa, the port of North Italy and Switzerland, and made Marseille a greater center for the trade in olive oil, peanut oil, and palm oil. By bringing trade to Mediterranean ports, the Suez Canal helped put three great tunnels under the Alps. Fast through trains now run from France, Germany, and Denmark to the Italian cities.

611. Ports of international concern.—This region has a number of cities called "Ports of International Concern." They are so called because the League of Nations has been given some authority over their trade, so that the peoples and countries near by may all have a fair opportunity for trade. Name these cities. (Fig. 325.)

612. Europe's needs.—Europe has a great trade within itself and with the other parts of the Mediterranean world, but it has so many people and so many factories that it also needs other continents to supply food and raw materials in exchange for manufactures. We have already seen that the American producers find in Europe a market for their

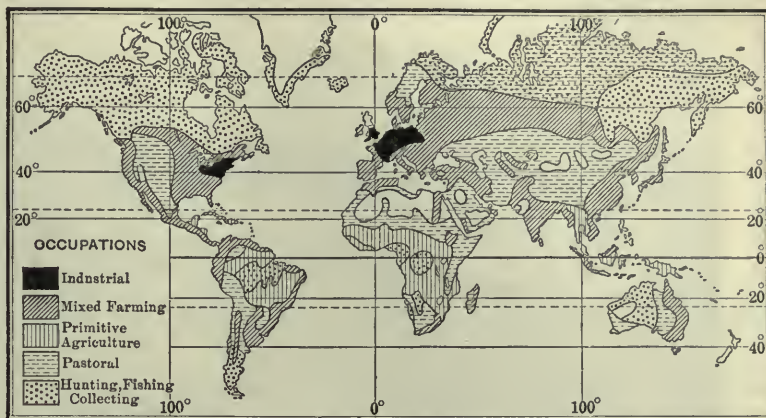


Fig. 467. Map showing, in a general way, the occupations of men. Why are both the industrial regions in the same latitude? Can you find points of similarity in other latitudes all over the world?

After O. R. J. Howarth

wheat, corn, meat, cotton, oil, and lumber. We shall see that every other continent that we study also has a great trade with Europe; in most cases a greater trade than with North America. This happens because Europe has many more cities and more people than North America (Appendix), and consequently has need for more things.

QUESTIONS

1. Name one article of import and one of export from each country of Europe, North Africa, and Southwest Asia, and show a place where you think each would be traveling by ship.
2. Name five ports through which the trade of the plateaus of Asia Minor and Iran should pass.
3. What would be the shortest way you might travel by water from Marseille to Paris?
4. Why is the control of Constantinople of so much importance to all the countries of Europe?
5. What cities would export and import the following: cork, olive oil, figs, manufactured silk goods, gloves, fine china, carved wood, and Persian rugs?
6. Has Switzerland a large or a small foreign trade? Why?
7. What countries of Europe have most difficulties in carrying on trade? Why?
8. What will be the return cargo in boats carrying cotton to Marseille? coal to Genoa? meat to Lisbon?
9. Plan a trip to visit the most important places of the British Isles and of the continent of Europe, starting from Liverpool. Consider that your time and money are limited. Trace the route of travel.
10. Which are the great manufacturing countries of Europe?



Courtesy Wm. Thompson

Fig. 466. Port Said and the Suez Canal, which links the Mediterranean and the Red seas. Can you tell what route ships had to follow before this canal was cut? Where can a ship on this route find coaling stations? (Fig. 9.) Of what value is this canal to Great Britain? to the United States?



Courtesy The Washington Post

Fig. 468. The city of Darjeeling, a cool summer resort on the Himalaya slopes, Bengal, India. In the background, a hundred miles away, is the highest mountain peak in the world, Mt. Everest, 29,002 feet.

EASTERN AND SOUTHERN ASIA

ASIA—THE CONTINENT

613. Size.—Asia, the largest of continents, is larger than Europe and Africa together, or than North and South America combined. We can understand its size better if we look at the map (Fig. 469). On the map Europe looks like just a little peninsula stuck to the corner of Asia. The two continents are really one great land mass which is sometimes called Eurasia. The mainland of Asia reaches farther north than that of any other continent, and it also reaches southward almost to the equator.

614. Geographic wonders.—Asia has every kind of land to be found in the world and many wonders not found elsewhere: (1) the highest mountains, the Himalayas; (2) the highest plateau, Tibet; (3) the district of greatest rainfall, where the warm moist winds from the Indian Ocean sweep up against the south slope of the Himalaya Mountains; (4) one of the world's emptiest

deserts, the great Empty Quarter of southern Arabia (Sec. 582); (5) the longest desert, which extends a distance of forty-five hundred miles from Mekka in Arabia almost to Tsitsihar in Manchuria, with but a few small oases to break the almost endless waste; (6) the coldest place in the world, which strange to say is not at the north pole, but at Verkhoyansk, in the midst of the continent near the arctic circle, east of the Lena River. (Fig. 329.) Why is this place colder than the pole? (Sec. 409.)

615. Fierce animals.—Asia has the largest of wild animals, the elephant, and the most deadly of animals: (1) the cobra of India, a snake whose bite is fatal, and (2) a wild buffalo which lives in the jungles of the Malay peninsula and secretly hunts the hunter, springing on him from the thicket and stamping him to pieces.

616. Ancient civilizations.—Asia is the seat



Fig. 470. Indian snake charmers with cobras. The cobra is one of the largest and deadliest of snakes.

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of some of the world's oldest civilizations, most of which have fallen into decay. We have seen how, time after time in Mesopotamia, one great empire was built upon the ruins of another. The same thing has happened in other parts of Asia. But in China we see a country whose civilization has continued century after century since thousands of years before Christ. No other country has remained so little changed while the civilizations of western Asia and of Europe have risen and fallen again and again. A Chinese student in an American university was asked a question about his family. He began his answer by saying, "I trace my family history four thousand years."

All of the great world religions—Judaism, Christianity, Mohammedanism, Confucianism, Brahminism, and Buddhism—have had their beginnings in Asia.

617. Many people.—Asia is a continent of vast, empty spaces and of painfully crowded

lands. More than half the people of the world live in Asia. The islands off her shores have more people than has the United States or all of South America. India and China are the countries having the largest populations, while China proper is the most densely peopled of all large countries. No other continent has so many kinds of people. India alone has as many kinds of people as the whole of Europe, and Europe has many more kinds of people than North America. Asia has great numbers of men and great resources. In the future she may rise again to great power.

618. How we shall study Asia.—We have already studied large parts of Asia, because they were so much like parts of Europe and

Africa that they needed to be studied at the same time. Now we shall begin at the northernmost region and pass southward, seeing how climate and surface divide the greatest of continents into regions that differ greatly from each other.

QUESTIONS

1. Give 12 ways in which Asia stands out prominently in comparison with the other grand divisions.
2. Name the plateaus of Asia; the plains; the peninsulas; seas, gulfs, and bays; deserts, and the largest islands.
3. How many things can you name that you eat, drink, wear, or have in your neighborhood that may have come from Asia? Can you tell why and how they came?
4. What countries in Asia would you like to visit? Why?
5. Are there any you would prefer not to visit? Why?
6. How would you go to Asia from a place in central Europe? from London?
7. Compare the size of the desert area of Asia with the Sahara.
8. How can you account for ancient civilizations being connected with a continent which has so many desolate, unexplored regions?
9. Why is there so little general knowledge of Asia's wonders compared with the knowledge regarding Europe?



Fig. 471.



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Fig. 472. A Japanese priest in native costume of silken robes. A famous volcano is in the background.

THE ASIATIC TUNDRA

619. Likeness of Europe and Asia.—Some belts of territory in Europe go on without a break into Asia.

The tundra that reaches across the vast length of cold Siberia is the same kind of tundra that we found in Russia. (Sec. 488.) The only difference is that it is colder in winter and warmer in summer, because it is farther from the Atlantic. (Sec. 409, Figs. 328, 329.) It has the same reindeer, tended by various wandering Mongolian tribes, people much like the Lapps (Fig. 393) and the Eskimos (Sec. 357). The Tunguses are one of these peoples, and they show that a pleasant land is not necessary to make pleasant people. A traveler says: "All observers speak in enthusiastic language of the temperament and moral qualities of the Tunguses. . . . Full of animation . . . always cheerful even in the deepest misery, holding themselves and others in like respect, of gentle manners and poetic speech, obliging without servility,

unaffectedly proud, scorning falsehood, and indifferent to suffering and death—the Tunguses are unquestionably an heroic people."

620. Government in the tundra.—This region is marked on the maps as belonging to Russia, but really the Russian Government has little to do with it. These people are so far away and so few in number and so constantly on the move that it is almost impossible to rule them. They are living as they have been living for ages, except for the great help they receive from an occasional sledgeload of rifles, knives, needles, and trinkets that comes through hundreds of miles of forest to the south of them, in exchange for their furs and skins.

621. The future of this region will be the same as that of the European tundra. If you look at the map you can see that it is larger by far than England, France, and Italy together. As long as its resources are only moss and grass, it can export nothing but skins and perhaps reindeer meat. If oil or gold should be found, conditions might change while the mineral lasted. (Sec. 491.)

QUESTIONS

1. In which continent is there more land within the Arctic Circle: Europe, North America, or Asia?
2. Which does the climate of this region more resemble: that of the Arctic region of North America, or of Europe? Why? (Sec. 409.)
3. Would the discovery of gold bring a permanent population to the Asiatic tundra? Why?
4. Compare the Mongolian tribes of this region with the Lapps of the European tundra, from these standpoints: homes; occupation; food; government.

THE TAIGA, OR GREAT EVERGREEN FOREST OF SIBERIA

622. The world's largest forest.—The northern forest belt of Asia—called the Taiga—stretches eastward from the Urals, on and on and on, like an evergreen sea, all the way to the Sea of Okhotsk and the Bering Sea. It is unbroken save for a few mountain ranges whose heights extend above the timber line. The Taiga is as large as the entire United States. Its nearest rival in size is the Great Northern Forest of North America, which, like the Eurasian Forest, lies between the tundra on the north and the land of wheat

and oats, barley, rye, and potatoes on the south.

This cold Siberian forest, like the cold American forest (Sec. 348), is a vast expanse of evergreen, buzzing with mosquitoes in summer, and blanketed with snow for the many months of the long, cold winter. As in America, the wolf, the bear, and the fur hunter roam over its vast area. Like the American forest, it was scraped and dug by glaciers, and made rough and swampy. But in the winter it becomes smooth and level because the snow covers the roughness. Snow has always been a help to the lumbermen of the north woods and to the fur hunter traveling on snowshoes. Look at the temperature maps (Figs. 328, 329). What are the January temperature and the July temperature east of the Lena Valley? What is the difference between the two months? Is there any other place with as much difference between winter and summer temperature? What is the difference where you live?

623. A little-used land.—

The Siberian forest has no Gulf of Bothnia, no Gulf of Finland, and no White Sea, to which ships may come in summer to carry away wood. The Arctic ice pack is jammed against the Siberian coast for most of its great length, and the trading ship comes not to such a place. On the southern edge of the forest some lumber is cut for the Russian farmers of central Siberia, but most of this forest, like the Great North Woods of America, lies as a vast reserve, awaiting the time when man can use it,—if it is not burned before that time.

624. Useless rivers.—

It is a great misfortune that the Siberian rivers, those great log carriers of forest regions, flow north toward the land of ice and

polar bears instead of south toward the land inhabited by man. In which part of such a stream does the ice break up first in summer? The loose ice, floating north, finally jams against the tightly frozen ice in the lower part of the streams and forms great ice dams, which cause the rivers to overflow during the spring and summer, and thus to flood large areas of forest and tundra.

625. Minerals.—The south central part of this region has coal, and in an area of such great size, of which so little is known, we may expect discoveries of valuable metals. The southern and eastern parts have rocks that give promise of many mines. Much gold has already been mined on the upper Lena. If the ore is rich enough it can be mined anywhere in the forest or tundra, for now we know how to build railroads to such places.

626. The forest fire—a world problem.—The minerals will wait for men to find them, but fire often runs ahead of the lumberman and eats up the forests. This gives us

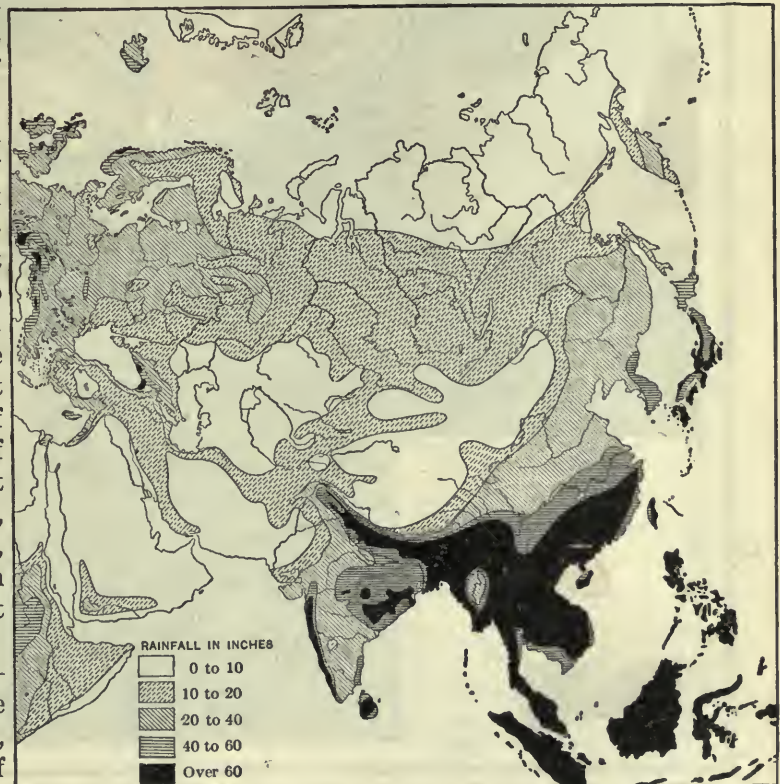


Fig. 473. Annual rainfall map of Asia, a continent of little rain. Does most of Asia receive heavy rainfall or light rainfall?

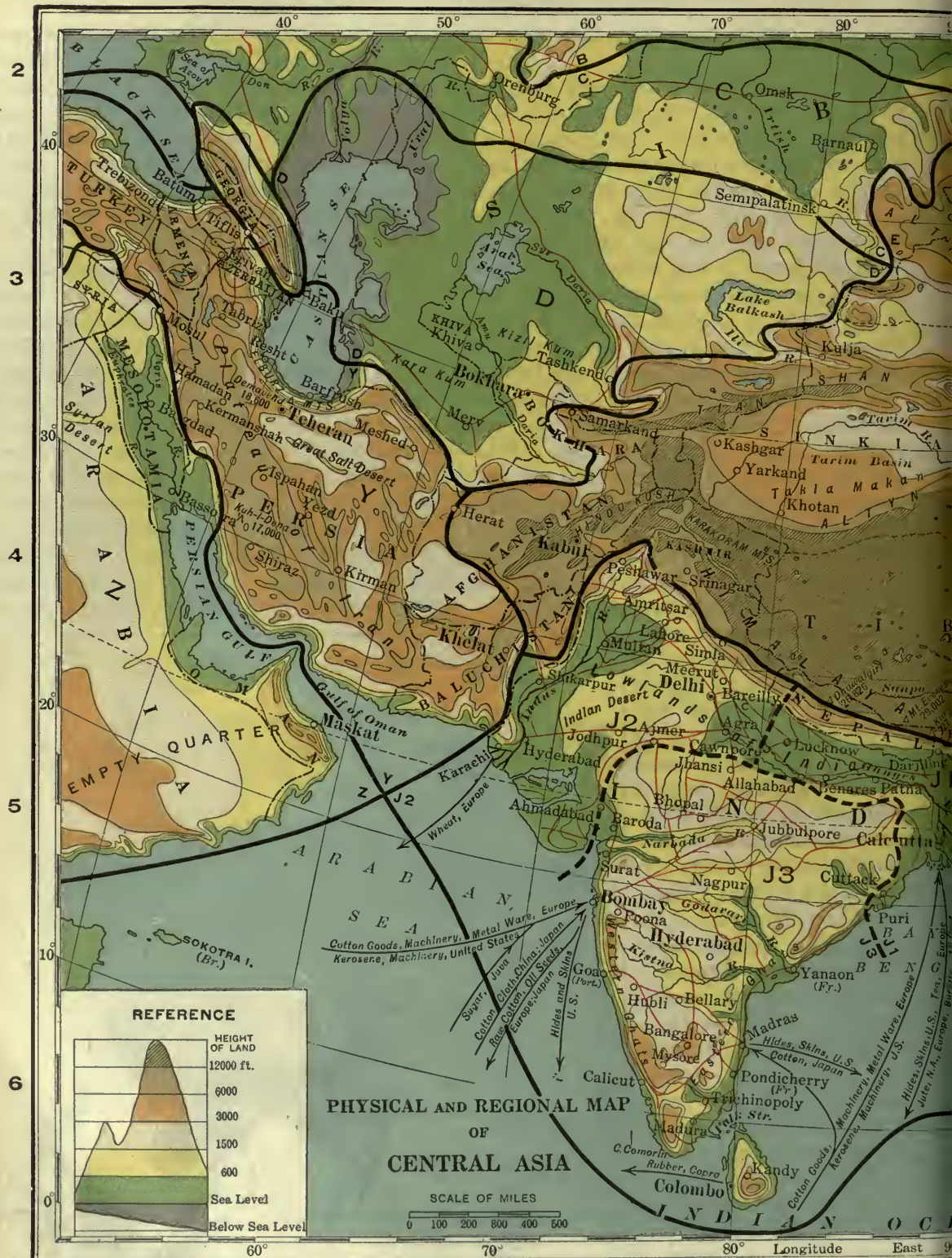


Fig. 474.



Fig. 474.



Photo. Publishers' Photo Service, N. Y.

Fig. 475. Flour mill on the Trans-Siberian Railway. Is there any other wheat region from which it costs so much to get flour to London?

one of the hardest problems we have,—to live in this world and leave it as good as we found it. If we remove the trees and grow food on all the good farming land we must take great care to keep forests producing lumber on the land we do not want for farms. Nature takes two centuries to make some trees. A lumberman can cut a tree down in a few minutes. If forest fires occur, they may kill, in a few minutes, the forest that took two centuries to grow. So much damage of this kind has been done in a very short time that even Pennsylvania, a state, most of which should be forest (Sec. 293), is not able to furnish as much lumber as is used in the Pittsburgh district alone. The world will soon be facing a lumber famine, largely because of forest fires.

Every one needs wood in many forms, and the world will soon need the lumber of the great northern forests of America and Eurasia. Can these world resources be saved and used, or must they, too, burn? It will take work to save them. This is one of the many big problems that world trade has produced. Man must solve the problem of threatened lumber famine or his children will feel the keen, sharp want of wood. We must find some new ways of doing things so that the lumber-using farmers on the plains of Illinois, the plains of the Po, and the Dutch meadows, can join with their lumber-using city brothers

in the skyscrapers of New York, London, Paris, and Rome to help keep the fires out of the forests of Siberia, Russia, Canada, Alaska, the Appalachians, and the Rockies.

QUESTIONS

1. Why is the Taiga set apart as a distinct region? 2. It might be said that in this region Nature has built a great storehouse of wood, and thrown away the key. Why? 3. What kind of trees would you expect to find here? 4. What common interest has all the world in this region?

5. What is meant by the timber line? Is it higher or lower in this region than in the Himalaya Mountains? Explain. 6. What are the possible exports from Okhotsk.

7. Describe a scene in this region as it is to-day. Imagine one fifty years hence, if railroads in that time have been extended generally throughout the region. 8. How many of man's uses for wood can you name? Can you suggest any substitutes for wood?

SIBERIAN WHEAT BELT

627. Location and bounds.—In Canada, a wide wheat belt lies to the south of the central part of the great northern forest. In Siberia, also, a wheat belt lies south of the Taiga. On its southern edge, where there is less rain, and greater heat and evaporation than farther north, it is too dry for grain to grow, and the farming region gives way to pasture lands, as in our own Great Plains (Sec. 105).

How wide is the Siberian Wheat Region? We do not know just where its boundaries will finally be, because men do not yet know how far south on the dry steppes men can learn to grow wheat, nor how far north in the land of forest and frost men can learn to grow wheat. (Compare with Canada, Sec. 91.) To the eastward, the region ends at the highlands near Lake Baikal. On the west, the unbroken plain extends into the plain of east Europe.

About the time that the Americans were building the later transcontinental railroads across the Rocky Mountains, the Russians

were building the trans-Siberian line through the flat lands of the wheat belt, and across the mountains beyond Lake Baikal and on to the Pacific at Vladivostok. Then came the Russian peasant-farmer to settle this fine wheat country, just as the American and Canadian settlers were doing in Dakota, Manitoba, and Saskatchewan. The two regions, each in the middle of its continent, are, indeed, very much alike in soil, in climate, in the appearance of the country, and in the kinds of crops that men grow there.

628. Surface and soil.—Flat, flat, very flat is the land, and very black and very rich is the soil of central Siberia. Day after day the train will carry you through flat, black land, past villages of one-story houses built of wood brought by rail from the Taiga. There, also, are the sod houses which serve as homes for the newest settlers. (Fig. 96, Secs. 93, 95.)

629. Climate and agriculture.—The winter is cold, with months of freezing days without a single thaw. Not much snow falls, but there is enough for sleighs and sleds. With horses galloping across the bitterly cold plains, farmers can haul their grain and frozen meat many miles to market. The summer, like that of the Northern Wheat Belt of the United States and Canada, has light rain which just suits spring wheat. This land can also produce, barley, oats, potatoes, beets, and hay. At the northern edge there is less evaporation, so that the scanty rain makes moisture enough to support the forest. In some places the settler must clear away the forest to get a field, as settlers do in the northern part of the wheat region of western Canada.

What shall the new settlers in this region sell? It is a very long way to the markets in western Europe. The freight rate must be high, so the settler must sell small valuable things like butter, eggs, and wheat; not bulky cheap things like potatoes and oats. The people of western Siberia sent for Danes



Fig. 476 A water tower and station on the Trans-Siberian railway in the edge of the forest country What change in daily living did this road make?

Courtesy American Red Cross

to come and teach them how to make good butter, which, before the World War, used to go by carloads to the Baltic ports for shipment to England. The Danes also showed the farmers how to work together and run coöperative dairies. Siberian coöperative societies were among the best in the world at the beginning of the World War.

630. Future.—Siberia is one of the world's great grain reserves, but it would be more useful if its several navigable rivers (Fig. 529) gave outlet to the Indian Ocean rather than to the Arctic. But the Arctic is not without hope. In 1919, a Swedish ship made the two-thousand-mile journey from Gottenborg, through the Kara Sea, to the mouth of the Ob River, and traded her cargo of manufactures for a cargo of farm produce that had been brought down in boats, through the forest district, from the Siberian Wheat Belt. Some people think that ships may visit this place regularly between July and October. If so, it will be a great boon to Siberia and to the entire commercial world.

From what we know of the reason for the growth of cities (Sec. 321), we can tell that this region will not have a big city like Chicago. The Trans-Siberian Railroad and others not yet built will help the boat traffic of the rivers to build up a number of small cities.

We do not know how valuable this grain country may finally be to the world. We do



Courtesy International Harvester Co.

Fig. 477. The ancient Steppes, the ancient dry-land beast of burden, and a mower from America. Of what are the traces made? Would the harness fit a horse?

not know how big it is; but certainly it is longer than our Great Plains between Mexico and Canada; and certainly it is wider. It is a place of enormous possibility, once it is all used, and, as in Canada (Sec. 91), new crops and new methods, especially the use of the tractor, may cause its extension both northward and southward.

QUESTIONS

1. The Wheat Region of Siberia is larger than the Great Plains of the United States. Then why is Siberia not a leading wheat-exporting country? Why is spring wheat raised here? 2. Compare a wheat harvest scene here with one in Kansas under the following topics: Time of year; Appearance of harvesters; Farming implements. Is there a part of Fig. 477 that might have been taken in Kansas? 3. Compare the cities of this region with those in the Red River region of North America. Compare transportation facilities.

4. What characteristic has this region that would lend itself especially to the cultivation of wheat with modern tractors and harvesters? 5. Do you think the wheat here is shipped as grain, or as flour? Give reasons for your answer.

6. What would encourage the amount of production of wheat per acre? What would cause an extension of the wheat area? 7. Why is there so little snow in this region? 8. In what way should the Trans-Siberian Railroad help famine in China? 9. What commodities could be exchanged between Omsk and Obdorsk on the Ob? Omsk and Tashkend? 10. Take two journeys from southwest Siberia to western Europe, one north by sea to Sweden; one west by rail to London. 11. Tell what countries and rivers are crossed, and the Siberian products these countries buy. 12. What cargo goes back to Siberia?

EURASIAN STEPPES AND DESERTS

631. A dry, flat land.—Europe's dry district is near the Caspian Sea (Sec. 462). It is called the Steppes, and extends far into Asia. Steppe is the European word for a flat plain with scanty grass. How long is the region of the Eurasian Steppes? (Fig. 474.)

In this land of dry flatness, a little rain falls in summer. Fortunately it comes at a time when it can do the most good by making grass grow, giving

a pasture-land that is like parts of our Great Plains. Other sections are like parts of our Great Basin. Some parts are salty plains; some are sandy desert. The three bodies of water in the Steppe region are all salty, like the Great Salt Lake and the lakes of Nevada. (Sec. 137.)

632. Three nomad races.—In such a land of scanty grass and little water, the people must be nomads (Sec. 576). They are rich



Photo. Ellsworth Huntington

Fig. 478. Kirghiz milking a sheep. These people also get milk from mares and camels.

in horses, sheep, donkeys, and camels. The camel in this dry land (the Bactrian camel) has two humps, and the desert sheep have humps of fat on their backs or on their tails (Fig. 480). The people live in thick felt tents, wear coats and caps of sheepskin, and have piles of wool blankets to keep themselves warm in the bitter cold winter. There is little snow, so the animals can pick their living in winter as they do on parts of the Great Plains of the United States.

A nomad people called Kirghiz live with their flocks and herds in the central, northern, and eastern parts of this region. They claim to be descended from Japheth, the third son of Noah.

In the corner of the region between the Caspian Sea and Persia are the Turkomans, who live much as the Kirghiz do. It was their brothers, the Turks, who swarmed across the plateau of Iran nearly seven hundred years ago, bringing great sadness to the lands they conquered.

The country north of the Caspian Sea is the homeland of the Cossacks, who are such wonderful horsemen. Their great sports are horseback tricks, such as riding three horses at once, jumping or even somersaulting off of a horse as it goes at a full run, and jumping back on it again while it still runs at full speed. These people can do the riding tricks of the circus performer. For generations they have been cavalymen in the Russian armies and are greatly feared.

633. The Caspian Sea fisheries.—The great River Volga flows through the arid land of the Cossack country to the Caspian Sea. Not long ago, as geologists count time, the Caspian was an arm of the Arctic Ocean. At that time it was supplied with seals and a great sea fish called the sturgeon. The seals and sturgeon still live there, and the sturgeon fisheries of the Caspian and the Volga have long been the greatest in the world.

634. Irrigation and cities.—Name some rivers that flow into this plain from the Asian mountains. They bring enough water from the mountains to irrigate rich valleys. Here oasis cities have arisen in the midst of



Photo. Ellsworth Huntington

Fig. 479. Kirghiz costumes, and house of felt on frame of poles and reeds brought from some distant stream.

gardens such as those in the irrigated lands of Arizona and Nevada. (Sec. 139.) There are Tashkerd, Khiva, Samarkand, and other cities. They are all ages old, older by far than London, Paris, or Rome. Perhaps they belong to the time of Babylon and the pyramids.

635. Conquest and emigration.—Such fertile spots in a nomads' land have always been great temptations to hungry rovers. Nomad conquerors have often ruled these cities. The people from the central plain of western Asia and eastern Europe, seeking homes or booty in better lands, have for ages been a terror to all farmlands within their reach. These migrating bands fought fiercely for the land they wanted. Many times have they forced their way into Europe, Persia, and India. To keep out these home seekers, the Chinese finally built a great stone wall, longer than the railroad from Boston to Chicago. We can still see it (Fig. 474) reaching over hills, mountains, valleys, and plains. It is wide enough on top for a wagon road. Night and day, year in and year out, for



Photo. J. Russell Smith

Fig. 480. This sheep of the desert's edge stores fat in his broad tail as the camel does in his hump. Fat sheep tails are of several shapes.

several centuries, the Chinese armies watched from the top of that great wall.

636. Russian conquest and the railroad.—After railroads made traveling easier, the Russian Empire conquered all this country. About 1880 a Russian railroad was built connecting Tashkend, Samarkand, and Merv with the steamboats on the Caspian. Later a more direct line was built from Orenburg, on the Ural, to Tashkend.

The railroad made a great and sudden change in trade. For hundreds and thousands of years these towns had sent light things, such as wool, skins, handmade rugs, and silks, by caravan to Bagdad, Constantinople, and Nizhni Novgorod. Then came the railroad and made it possible to ship heavy things too. In a short time the oasis orchards began to supply Russia with dried apricots, and with cotton, which grows here in the hot summer, as it does in Arizona.

637. Future.—There can be no great increase of population in this region, except by irrigating more land. The grasslands have been fully used for ages.

Rice, silk, fruit, corn, and the splendid gardens of the oases are using all the water that is now to be had. Fortunately, reservoirs may be built in the mountains of Central Asia, as in the Rocky Mountains of the United States. These will enable flood waters, now wasted, to feed millions of men.

QUESTIONS

1. Why is herding the chief industry of the Eurasian Steppes? Tell five ways in which sheep are useful to the nomads. 2. What is there about this land that resembles our Great Basin? Tell how the people and animals of the Eurasian region differ from ours. 3. What is unusual about cotton and seals being found in the same locality?

4. Point out a resemblance in the development of the dried fruit business in California and in central Asia after the railroads came. 5. Why do the Russian Cossacks make excellent cavalymen? 6. Why does Moscow want the oasis cotton? 7. Trace the journey by rail from Tashkend to Moscow. Through what continents, countries, and regions do you pass? How much of the journey from Tashkend to Nizhni Novgorod can you take by water? 8. What is sent to Nizhni Novgorod? What is brought back?

9. Compare the prospects of this region with those of Nevada and Arizona. 10. If you were elected to govern this region, what would you do to improve it?

THE HIGH, DRY PLATEAUS AND MOUNTAINS OF CENTRAL ASIA

638. A high, dry, and vast region.—In the very center of Asia, shut in by mountains, is one of the large regions of the world, almost as large as the United States. It is little known because it is little used. It



Courtesy American Museum of Natural History, N. Y.

Fig. 481. Two yak picking a living in the snow of a high Asian plateau. Why should they have very long hair under their bodies?

is little used because it has little that man can use—it is so high, so cold, so dry, so hot, and so hard to reach. Geographers usually speak of it under the names of its four parts: Tibet, Sin Kiang (or Eastern Turkestan), Mongolia, and Afghanistan.

639. Tibet.—A few years ago an Englishman with his camel train left Srinagar in the province of Kashmir in northern India for an exploring trip across Tibet. Traveling was so difficult that it took him eighty days to reach Khotan in Sin Kiang. How far

is it? The journey took him across the north-western corner of the plateau of Tibet, the highest plateau in the world. Large areas of it are higher than Pikes Peak or the top of the Alps. As the plateau is shut in on the south by the still higher walls of the Himalaya Mountains, the winds from the ocean cannot bring much rain to Tibet and the other Central Asia plateaus. Therefore the region is dry. Because it is very high, it is cool in summer, and in winter so very cold and snowy that much of it is quite impassable.

Perhaps you see now why the Tibetans have been able to keep nearly all strangers out and to keep their country to themselves like a little closed world. You can also see why Tibet is sparsely peopled and by shepherds only, except for a few towns in valleys where snow water permits irrigation.

The Himalaya Mountains, the highest in the world, are little known because traveling there is almost impossible, and because the natives have not wanted white men to go there. Until 1921 no white man had ever been within sixty miles of Mt. Everest, the highest peak in the world. In 1921 the greatest mountain-climbing expedition ever seen set out from London for a two years' campaign to find a path to Everest and if



Fig. 482. Caravan of camels with their bales of carpet wool resting in Hatumen Street, Peking. Where did this wool grow? Where may it be made into carpet? (Sec. 266.)

Courtesy Trans-Pacific Magazine, Tokyo

possible, to climb it. Can you tell something about this expedition?

640. Turkestan and Mongolia.—The plateaus of Turkestan and Mongolia are not so high as that of Tibet, but they are much drier and most of their surface is desert. These wide, dry plateaus of Central Asia are so difficult to cross that they keep peoples apart. A journey from Samarkand in Russian (western) Turkestan to Peking in China is longer than a journey from New York to San Francisco. Take the map (Fig. 474) and trace out the route. From Kashgar to Hami the camels must follow the base of the high Tianshan Mountains. Small streams, fed by melting snow, run down to the edge of the plain and furnish drinking water, a little pasture, and perhaps a few irrigated gardens, making a string of little oases at the edge of the great, dead desert of the Tarim basin. Trace a caravan route from Peking across Mongolia. (Fig. 529.)

641. The nomad shepherds.—A few nomads with sheep, goats, and camels get only a scanty living on this high, dry world, that is hot in summer and bitter cold in winter. They know the water-holes and mountain pastures, and they believe it brings bad luck to plow the ground. By



Fig. 483. A Korean valley. How many villages do you see? What do you notice about the plan of the houses?

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caravan they send out bales of wool, and skins from their flocks and from the wild deer, antelope, and other animals that they hunt.

China claims to rule Mongolia, Sin Kiang (or Eastern Turkestan), and Tibet. China has governors in such towns as Kashgar and Hami, but most of the people are nomads and rule themselves, because the governors in an oasis town do not know where the nomads may be at any particular time because they are constantly on the move.

642. Afghanistan is not as high as Tibet, and a railroad might be built through the country from the plains of Central Asia to the plains of India without much difficulty. Before the World War there was a jealous fear between Russia and England that an army might follow such a route. Neither nation was willing to have the armies or railroads of the other enter Afghanistan, so both nations left Afghanistan as a kind of no-man's-land. Its ruler, a tyrannical despot called the Amir, has but little authority over some of the wild tribes that live in the high mountain pastures, the little irrigated valleys, and the dry plains that are so hot in summer and so cold in winter.

643. Future.—Afghanistan, Tibet, Sin Kiang, and Mongolia are nearly as large

as the United States, but have few men in their wide spaces. With no large streams for irrigation, this land will continue in the future in much the same condition as at present, except where valuable minerals may be discovered. In that case railroads may be built and mining towns may spring up as quickly as they have done in Nevada. (Sec. 141.) Already much gold and copper have been produced on the Siberian side of the Altai Mountains, which form a part of the great mountain wall along the northwestern edge of the region.

QUESTIONS

1. In 50 or 60 days you can travel around the world by crossing Europe, Asia, and the United States. Why did it take nearly three months crossing one corner of Tibet to reach Sin Kiang? 2. If there were no Himalaya Mountains, what kind of a region would this be? 3. Why is there so much interest among explorers in regard to this region? 4. Why is there more interest in exploring Tibet than the other plateaus? 5. Tell some of the dangers and some of the pleasures of travel in Tibet.

6. Would there be much freight on a railroad from the Yangtze to the Caspian? 7. Account for the many camels seen in the city of Peking. 8. Do the Chinese have camels? Why?

9. Name the plateaus of this region, and tell of what country each forms a part. Make them of sand or clay. With strings show the caravan routes. Make the camels in clay. With what exports should they be laden? 10. Where will you put the Great Wall of China? 11. Is it as much needed now as when built? 12. If you had to live on one of these plateaus, which would you choose?

THE JAPANESE RICE REGION

PART I.—THE LAND

644. Bounds and character.—The Japanese Rice Region includes most of the Japanese islands and a part of the Korean peninsula. In this region the summers are warm enough, moist enough, and long enough for rice to grow well. Most of the people both of Japan and Korea live in the rice region, and eat rice as

their chief food. Most of the land is forested mountains. Some of the mountains are volcanoes. One of them, the beautiful Fujiyama (Fig. 472), is regarded as sacred by the Japanese. Because the country is volcanic, Japan has many earthquakes. The valleys and plains are green with crops, and are dotted with villages in which millions of farmers live. They toil day in and day out on their little farms, the women and children helping them—working, working, working. Big and little, male and female, they seem to be forever at work. Because the climate is favorable for food production, this tiny region has more people than all the rest of Asia that we have studied. All the other Asiatic regions, except the wheat belt, are too dry or too cold to support many people.

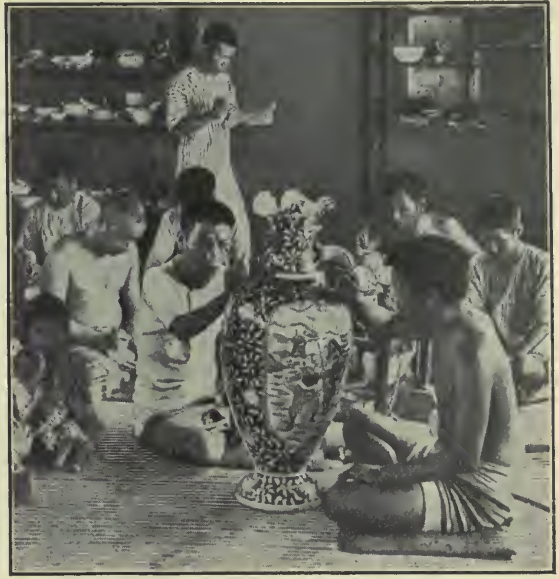
645. The cyclones.—Japan and Korea have rain both winter and summer. In autumn, winter, and spring they have cyclones very much as the United States and England do. Rains at these seasons let the people grow winter wheat (Sec. 74), and also barley and rye. Summer brings a new kind of rain wind, the monsoon.

646. The monsoon.—In summer the great, dry center of Asia becomes very hot. The heated air expands, becomes lighter and rises, and to take its place a great sea breeze



Fig. 484. Japan's rice acreage. Why is there none in the central parts of the islands?

of warm, moist air from the Indian and Pacific oceans blows into southeastern Asia. This is the monsoon. It blows day and night for several months, bringing moisture and sum-



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Fig. 485. Decorating porcelain in a Japanese factory. mer rain to all shore lands lying between the Indus and Amur rivers. Summer heat and summer rain make plants grow and help the farmer to produce abundant crops. For this reason the monsoon lands of Asia hold about half the human race.

PART II.—THE OLD JAPAN

647. An independent civilization.—Japan has a history very different from that of the other Asiatic countries we have studied. We have read of roving peoples, of conquests, of empires that rose and fell. Japan is different. She is protected by the sea. No foreigner has invaded her shores. For hundreds of years her emperors have ruled their beautiful land, while the industrious people, aided by their good climate, developed agriculture, hand industries, arts, and a high civilization. For many centuries the Japanese have been taught reading and writing.

648. An artistic people.—For centuries the Japanese were a nation of expert and careful farmers and skilled workers in wood, metal, clay, porcelain, silk, paper, and lacquer, which is a kind of varnish that we, in America, do not make. Japanese paper umbrellas and lanterns are so pretty that we sometimes use them for ornaments.



© Publishers' Photo Service, N. Y.

Fig. 486. The fine lady of Japan goes calling. Why does she not have a horse and driver, or an automobile?

649. Japanese flowers.—Many plants in American gardens were brought from Japan. The people are wonderful gardeners, both in fruits and flowers. With patient skill they have produced many varieties of fruits new to us. In Japan there are cherry and other fruit trees that produce beautiful, large flowers but no edible fruit. Cherry-blooming time in Japan is a kind of spring festival. Thousands go out to see the cherry trees that almost bury the little houses in seas of red and pink and white blossoms. Often poems are written to the cherry trees.

650. Good manners.—The people have lived close together for such a long time that they have made a great many rules about how one person should treat another. Even the little children are taught to obey these rules of conduct. Indeed, the Japanese and the Chinese are among the most polite people in the world.

651. Love of country.—The Japanese have long loved their country. They love it so well that they are willing to obey its laws more thoroughly than we in the United States obey our laws. As soldiers, the Japanese have shown great bravery, and the people declare they would die to the last man to save their country from invasion.

652. Sports and games.—Japanese, both young and old, are fond of sports and games, and have many that we do not know in this country. Their wrestlers and acrobats sometimes come to America and give amazing exhibitions of what they can do.

653. Japan's problem—the food supply.—For many centuries the Japanese supported themselves by farming and household industries. They had no foreign trade. After many centuries the population became so dense that the people had a very hard time to get enough to eat. That is Japan's great problem—something to eat. The three large southern islands are about one-twenty-fifth as large as the United States, but they have more than half as many people as the whole United States. Japan is so hilly that only about one-sixth of her land can be farmed. On the average, one acre of cultivated land has been made to feed four Japanese people.

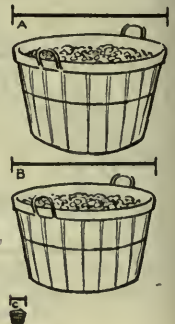
654. Little land, much labor.—When four people get their food from one acre of land, it means that they must work very hard, and by intensive farming raise many crops. As one acre of ground can not be made to produce enough to feed both men and beasts, the Japanese do not keep animals. Man must, therefore, do his own plowing. Sometimes men and women pull plows, but most of the land is turned by hand with spades and forks. This is called garden agriculture, or hand agriculture. In the main island of Honshu the average farm is only 70 yards by 175 yards (two and a half acres). The field that grows wheat, barley, or rye in the winter is immediately spaded up after harvest and planted to rice or some other summer crop. More than half of the cultivated land of this part of Japan has been leveled for rice fields, called "paddies." (Sec. 672.)

655. Bamboo.—Our Bureau of Forestry at Washington tells us that we are using up our wood in the United States about four times as fast as it grows. We are able to do this for a time because we have only been in this continent a little while. Long ago the Japanese found that they must

Fig. 487. Bushels of grain per person raised in 1911-13:

A. United States	50.8
B. Canada	47.4
C. Japan	5.0

You know that Japan does not import much grain. What does this fact tell about her wealth?



grow wood as fast as they used it. The wood that they cultivate is the bamboo (Fig. 516). It grows very quickly and is wonderfully useful. To the Japanese, and to the Chinese as well (Sec. 675) it is lumber, water buckets, pipes, and innumerable other useful things. A list of all the uses made of bamboo would fill a page or two of this book. The young shoots are even used as lettuce.

656. Japanese food.—The usual meal of the Japanese garden farmers consists of rice, beans or other vegetables, much cabbage and other greens, a little fish, soy bean oil, and soy bean sauce for flavoring. The Japanese meal is nourishing, and because of the green vegetables it is more healthful than a meal of bread and butter, meat and potatoes. Instead of bread and potatoes the Japanese eat rice, because it is the best crop to grow in a land that has a warm, wet summer. They use fish and beans instead of meat, because land is scarce, and therefore animals are scarce. For the same reason soy bean oil is used instead of butter. We may not know it, but we often use meat to make our meal taste good. For that purpose the Japanese use a bit of fish, or a sauce made from fermented soy bean meal.

657. Fisheries.—As the Japanese have neither room to raise meat, nor money with which to buy it, they must go to sea and catch fish. The waters near the Japanese shores are dotted with the sails of little fishing boats. No other nation except Norway has so many of its people catching sea food. Just as the people of California, Oregon, and Washington sail up to the coast of Alaska to catch salmon, so the Japanese now sail up to the cold Asiatic shores of Kamchatka opposite Alaska, and catch salmon and other fish, and crabs. This sea food is canned.

PART III.—THE NEW JAPAN

658. Japan's sudden change.—After we in America had the steamship, the railroad, and the telegraph, Japan was going along as she had done for centuries—beautiful, artistic, polite, but crowded and getting hungry. For many generations Japan had

refused to have anything to do with foreigners, and travelers from other continents were asked to go away. But in 1853 and 1854 an American fleet visited Japan, and the American Admiral, Perry, made a treaty with the Mikado, or Emperor. Japan then sent a minister to Washington and we sent one to Tokyo. Thus Japan entered the society of nations. In 1868 there was a revolution. Japan then became a limited monarchy, with a parliament to help rule.

659. Learning science and using it.—In 1868 Japan was living very much as Europe lived eight hundred years ago. In forty years she became one of the great powers of the world. The changes that have come in Japan have been among the most amazing things in all the history of the world. Most of the old Japan has remained, but to old Japan there have been added the new education, like that of Europe and America, and the new science which has made possible machinery, factories, railroads, steamships, trade, and a modern army and navy. How did this happen? Because Japan learned the scientific way of doing things, *and used her knowledge*. As an example, see the health of her army. When the Japanese army invaded Manchuria in 1904, in a war with Russia, a sanitary squad with microscopes went in ahead of the army. The squad



Photo. Ewing Galloway, N. Y.

Fig. 488. The horseless carriages of Tokyo.



Fig. 489. A bale of cotton and skeins of raw silk of equal value. What makes silk so expensive? (Sec. 664.)

tested every spring and well, looking for disease germs. If the water was found to be bad, the squad posted a notice to boil the water before using it. The soldiers obeyed, and the Japanese army came through that campaign in better health than any other army that had ever been heard of.

660. Equipping a nation.—This sudden change in ways of doing things happened because the Japanese government had sent many students to the universities of America and Europe. Japan began sending them as soon as she decided that she must use scientific methods. These students studied everything. They learned how to build and run railroads, ships, and factories, and to do things as they were done in Europe and America. Japan does not now send many students abroad, for she has colleges and universities at home, taught by professors who were trained abroad. The libraries and laboratories of a college in Japan are like those in America and Europe.

Many of the Japanese have even laid aside their picturesque and comfortable national clothes, and dress as do the Americans. They use automobiles, bicycles,

trolleys, and trains; they have the telephone, the telegraph, the wireless, factories, the airplane, and steamship lines to every continent. There are many newspapers in Japan, and an army and a navy that may be the most efficient in the world. Japan has a department of agriculture much like ours, and the Japanese government supports scientific work better than our government does. Her government does many things to aid industry at home and trade in foreign countries. Japan is, indeed, a highly civilized, very modern, scientific, and efficient nation.

661. Japan builds an empire.—This new Japan of science and machines, factories and ships, is working hard for a place in the world's trade. Japan's population is increasing rapidly. As she is using about all the land that can be used, the home-grown food supply no longer feeds her people. She must import food as well as raw materials. What has Japan to sell in payment? She is following the example of England and becoming a manufacturing nation, and with manufactured articles she will pay for her imports. Japan is rapidly building up, by conquest, an empire in Asia. Her first colony was the tropic island of Formosa, which she got from China in 1894. Here she produces some sugar, some tea, and most of the world's supply of camphor, which is secured by distilling the wood of the camphor tree.

Japan holds a part of southern Manchuria, where she has developed a wonderful bean industry; but most of the beans are grown by Chinese people who live there.

She has also the Chinese peninsula of Shantung, rich in minerals, which she took from Germany during the World War. Shantung is rich in coal and iron, and has many millions of people.

Fig. 490. The silk production of five nations (1919-20):

	Pounds	
A. Japan.....	48,800,000	
B. China.....	42,800,000	
C. Italy.....	4,000,000	
D. Levant.....	2,200,000	
E. France.....	300,000	

After the World War, Japan occupied the northern half of the island of Sakhalin. This island is rich in coal and fish.

662. Korea has been called the "Hermit Kingdom," because for many centuries it, like Japan, was shut away from the world. The people of Korea lived much as the Japanese did, but the population is not so dense as that of Japan. When Japan sent her students to Europe and America, the government of Korea was too dull, too weak, and too inefficient to do the same. In 1910 Japan annexed Korea and made it a Japanese province. The Koreans do not like foreign control, but Japanese methods have increased the Korean rice crop from forty million to sixty million bushels, and Japanese engineers are busy turning waste land into rice paddies. Thus Korea helps to feed Japan.

663. Factories and imports.—Japan's factories and manufacturing cities have grown almost as rapidly between 1890 and 1920 as have those of the United States. Japan is now becoming a manufacturing and commercial nation. She has nearly enough coal for her own use, but little iron ore. The chief import is raw cotton from the United States and India. Next come iron and machinery from the United States and England. She must also import rice from Indo-China, sugar from Java, and, to fertilize her rice fields, bean cake (Sec. 35) from Manchuria. She must import other things, too, for after all Japan is poor in raw materials.

664. Raw silk and tea.—Japan is working hard to build up export trade by selling factory goods, but her chief export is raw silk, a product of hand labor on the little farms. Women and girls make silk by unwinding the threads that the silk worm has wound around itself to make a cocoon in which to pass two or three weeks before it becomes a moth. The Japanese raise silk worms by the hundreds of millions. The worms are kept on trays in warm rooms, carefully tended, and fed enormous quantities of leaves from the mulberry tree. In the year 1918 we imported from Japan a dollar and fifty cents' worth of raw silk for every man, woman, and child

in America. Silk means work. So does tea, another export, which is made by carefully drying the leaves of the tea tree after they have been picked by hand.

665. Factories and exports.—Next among Japanese exports come cotton manufactures, silk manufactures, matches, porcelain, earthenware, beans, and peanuts. Japan gets some of the peanuts from Korea and China.

666. The Japan of to-morrow.—Instead of villages with paper walls and bamboo house frames, Japan is now building cities like those of Europe and America. Tokyo, Yokohama, and Osaka look like Chicago or Manchester. The buildings are of cement, brick, and steel. There are trolleys, telephones, and railroads. The iron-clad warship lies in the harbor, the freight steamer lies at the dock, and newspapers tell of New York, London, and Petrograd, and baseball games, just as American newspapers do. Factories and trade have made cities grow rapidly in Japan, just as they have in the United States and northwestern Europe.

To feed her polite but hungry people, Japan must always keep up her careful and laborious agriculture. She will steadily increase her manufactures and foreign trade, for which her people and her government work so diligently and skilfully.

QUESTIONS

1. One condition necessary to produce monsoons is large bodies of warm water, with large areas of hotter land near by. Which continent has the most regions under the influence of monsoon winds? 2. Study the map of ocean currents (Fig. 327) and temperatures (Fig. 329), and give a reason why Japan has a mild climate. Compare the climate of Japan with that of the adjoining mainland of Asia, and explain the differences. 3. How does it happen that Japan raises tea and silk, but the United States does not? 4. What countries of Europe carry on intensive agriculture, somewhat as does Japan? Why? 5. If you were traveling in Japan in regions away from the big cities, what are some of the things about your appearance that would cause the natives to stare? 6. What are some of the customs of the natives that would be hard for you to follow? 7. Compare the houses pictured in Fig. 483 with those in Fig. 431. 8. Of what material are they built? Why? 9. Why is Japan the only country of Asia that is recognized as a world power?

10. How do you think a scene in a business street of modern Tokyo would differ from the one in Fig. 488?



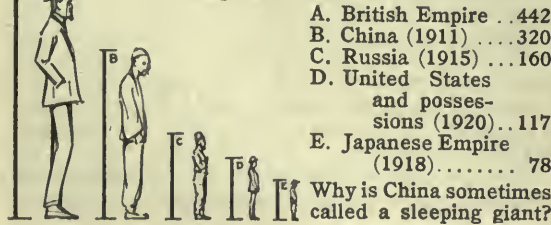
Courtesy U. S. Dept. Agr.

Fig. 491. Little fields in the terraced lands of north China. Will rain be more useful here or on sloping ground?

11. Compare the geography of England with that of Japan under the following topics: Climate; Location; Industries; Needs of the people. 12. What is meant by the Industrial Revolution in Japan? Why is Japan changing from an agricultural nation to one with manufactures? Compare her history with that of England in this respect. 13. What great advantage has England in her natural resources? 14. How does Shantung help Japan's manufacturing? 15. Which has gained more as a result of Perry's visit in 1854, Japan or America? Give arguments on both sides. 16. Make an imaginary visit to a Japanese home, and describe all of your experiences of a day and a night. 17. How did Japan's island location affect her history? 18. Where is a natural place from which to get her raw materials? Where will she find the best market for her cotton manufactures? 19. Describe the cargo of a ship coming into the harbor of Osaka from the United States. Describe its return cargo. 20. Describe a cargo going from Nagasaki to Manchuria, and the return cargo. 21. Why does Japan need colonies? Name and locate all of her colonial possessions. (Fig. 10.) 22. Show on the map what territory she has acquired by the World War. 23. Which one did China contest? Why? Which did the United States contest? Why? 24. Fill in the chart:

CHIEF IMPORTS INTO JAPAN.	FROM WHERE.	CHIEF EXPORTS FROM JAPAN.	TO WHERE.

Fig. 492. Population of the five largest nations and empires in millions:



- A. British Empire . . 442
 - B. China (1911) . . . 320
 - C. Russia (1915) . . . 160
 - D. United States and possessions (1920) . . 117
 - E. Japanese Empire (1918) 78
- Why is China sometimes called a sleeping giant?

THE CHINESE REGION

667. Bounds and character.—The region called the Chinese region takes in nearly all the provinces that are often called China Proper. It lies between the Central Asian plateau, the Manchurian Region, and the sea. Look at the map (Fig. 474), and describe briefly the physical features of the region.

668. Comparison with the eastern United States.—The Chinese Region and that part of the United States east of the Mississippi River are about equal in size, and each occupies the southeast corner of its continent. They are in about the same latitude and can produce very much the same crops, because the climate in the two regions is quite similar. The chief difference in climate is the greater summer rain of southern and eastern China, brought by the monsoon (Sec. 646). The monsoon sometimes causes sorrow in China by bringing so much rain that floods drown people by the thousand. Sometimes the monsoon comes too late or does not come at all, and then the crops fail and people starve.

The greatest difference between the Chinese Region and the eastern United States is in the number of people. One has 70,000,000 people, the other has 300,000,000 people who live in a region that has more high mountains than has the eastern part of the United States.

Much of the coast plain of the United States is sandy and little used. The wide

coast plain of China is very rich delta land of clay and mud, and every foot of it is used. It supports swarms of people, who live as the Japanese lived before they began to develop their foreign trade. Most of China's people live on their little farms, and often they travel about the coast-plain country in canal boats.

The great river of America, the Mississippi, flows south through large areas of unused swamp. The Yangtze, the great river of China, flows east in the same latitude as Charleston, South Carolina. Along this river there were swamps, which centuries ago were turned into rice-fields. The Yangtze itself has for ages been a great highway. Thousands of sailboats and steamboats carry freight up and down the river.

669. The oldest nation on earth.—The Chinese have light

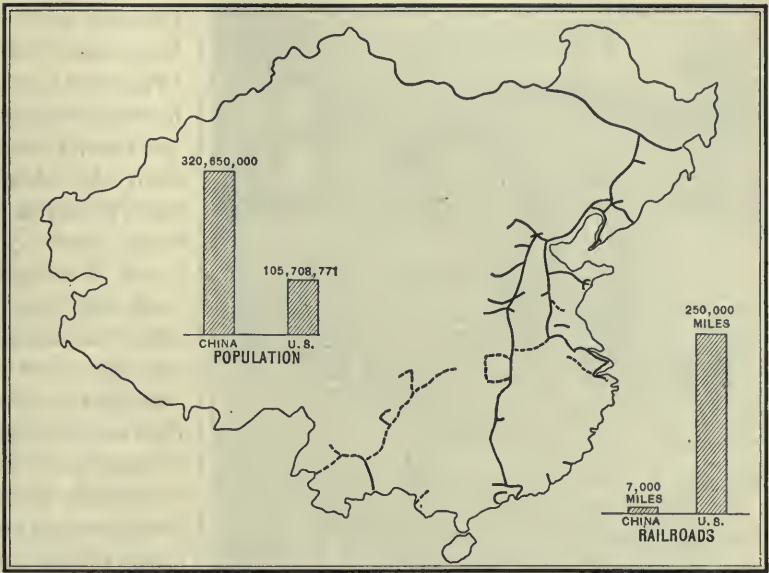


Fig. 495. China and its railroads shown on the same scale as the United States (Fig. 494). What do the sets of columns marked "Population" and "Railroads" tell of the transportation opportunities in the two countries?

Fig. 493. Total populations in millions:

A. China (1911)	320
B. United States (1920)	105



yellow skin, almond-shaped, slanting eyes, and stiff black hair, which was formerly braided into a long "pig-tail". They have been civilized longer than any other race. When Solomon built his temple in Jerusalem, the Chinese had been a civilized nation for many centuries. The various nations of Europe came into being, and still China remained as in past centuries. Greece rose and fell, Rome rose and fell, and China

still lived. Why? Because the country was good for agriculture, and was protected by nature from invaders. The waves of migrating people who broke up the Roman Empire did not reach China, because there were high mountains, plateaus, and deserts to the west of China. On the east was the wide empty sea. On the south the tropic forest reared its jungle wall and on the southwest were high mountains, sharp valleys, and deep rivers, and yet more



Fig. 494. Map showing the railroads in the United States. Compare this with Fig. 495, and state in which country you would prefer to carry on a business that would require rapid transportation facilities from the interior to the coast. Has nature given China more natural waterways than the United States?



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Fig. 496. A Chinese farmer grinding corn with a stone rolling on a saucer-shaped base.

high mountains, sharp valleys, and deep rivers. In the winter the mountains are covered with snow, and in the summer the valleys are flooded with monsoon rain. Surely nature gave China an almost perfect barrier! Only in the north could large bodies of people with horses, flocks, and herds cross into China, and there the Chinese built the Great Wall to keep invaders out. Read about it in some encyclopedia. Such invaders as did occasionally enter by this northern route could not seriously disturb the Chinese farmer-nation.

670. An isolated, independent people.—

Thus for century after century the Chinese had nothing to do with the people of any other country, and wanted only to be let alone. They could live thus isolated, because they had at home everything a nation needed. China reaches from Peking, in the latitude of the land of wheat, corn, and barley in the United States, down to Hongkong, in the latitude of Havana, the land of oranges, bananas, and sugar cane. In the west are mountains rich in minerals, and the nomad's country, where wool and hides are produced. The different parts of China traded with each other by means of *junks* (sailing vessels) that went up and down the coast, by boats on many canals and rivers, and by caravans over hills and high mountains and swift streams.

671. A nation of hard workers.—The

Chinese have been in their land for such a long time that the population is very dense (Figs. 492, 495). There is only a little land for each family. For this reason they must work hard for a living. Everybody works, even the children. The children of China have rather a hard time of it, because they begin work so young and work long hours.

An Iowa farmer often has 160 acres of land, and has horses, tractors, reapers, and other machinery. Each year he raises thousands of bushels of grain. This is enough to give each member of his family the five or six bushels a person needs to eat in a year, and wagonloads besides—enough to feed many horses, cattle, and pigs. The Iowa farmer raises one crop on each field each year. Some of his land is usually in pasture. The farmer on the Chinese plains often has only two acres or even less, and he raises two crops a year on all of it. None of it is in pasture, because the yield from pasture is too small.

In the autumn, with the help of his family, he sows the land to winter wheat. In summer, if the land is in the northern or the inland section of light rain, the farmer uses a part of it for sweet potatoes, a part for corn or millet, and a part for soy beans. The only animals on the place are some chickens,



Fig. 497. Porters carrying bales of Chinese tea up the mountains into Tibet.

a cow that pulls a cart and lives on straw and bean stalks, and a pig that eats scraps that no other animal will eat. To prepare the ground for crops a spade is used instead of the plow. Though the land yields two crops a year, there is very little to sell, because the family must eat nearly everything that can be grown.

672. Rice.—You remember that Holland is the gift of the Rhine. Look on the map (Fig. 474), and see how the great plain of northeastern China is also the gift of two rivers. Which ones are they? They have cut sand and clay from the mountains, and have carried them down and built up the wide lowlands. This making of new land goes on so fast that cities that were once seaports are now thirty miles inland. This plain is the land of rice, the great summer crop of the warm lowlands of Central and South China. Here each summer tens of millions of men and women, boys and girls, work hard in the millions of little ricefields.

It takes a great deal of labor to grow rice in the way it is grown in the Far East. Rice is a swamp plant. To make it feel at home and grow well, the people turn their ricefields into ponds. To do this they make the land as level as a floor, so that the water may be at the same depth in all parts of it. Then they make a bank of earth



Photo. Wm. H. Rau, Inc.

Fig. 499. A memorial arch of carved stone near Soochow, China. Chinese works of art require vast labor.

about a foot high all around the field. To bring water to the ricefields, canals cross the low plain in every direction, as roads cross the farmlands of the United States. Sometimes the water will run from the canal into the ricefields, but if it does not the people must do the hard work of lifting it from the canals up to the field in buckets or by treadmills.

The ricefield is fertilized with care and with an almost unbelievable amount of hard work. Mud that is shoveled out of canals is spread upon the fields year after year and thus, little by little, the plain has been built up. Sometimes mud from the canals is piled on stacks of clover and straw, and afterward shoveled over and over to mix it with the decaying stalks. Thus a fine compost is made, which is spread upon the fields.



Courtesy Trans-Pacific Magazine, Tokyo

Fig. 498. The basket merchant with his wares on a carrying pole, a very common device in China. Why doesn't he use an automobile?



Photo. Wm. H. Rau, Inc.

Fig. 500. A Chinese jitney. Why is a wheelbarrow a good vehicle for bad roads?

People wade nearly knee-deep in mud and water, weeding the rice by hand and pushing the weeds down into the mud so that they may decay, and help to fertilize the rice plants. As the grain ripens, the water is drawn off and the ground allowed to dry. The grain is harvested by hand, set up on sticks to dry, and threshed by hand. Then the ground is at once spaded up, and the crop of winter wheat or barley is planted for the harvest of May or June.

To save time for the next year's crop, the rice is planted in little seed beds, before the wheat or barley is harvested. The young plants are moved to the field or "paddy" and set out by hand as soon as the wheat is cut. Think of all the work that must be done to raise these two crops of grain each year!

673. The Chinese meal. —In southeastern China the commonest meal consists of rice, beans, a little vegetable oil, and a surprisingly large amount of some kind of boiled greens, of which the Chinese have many varieties that we do not use. Long ago they learned that greens are very wholesome. In place

of butter they eat vegetable oil made from soy beans or the seed of rape, which is a kind of cabbage. These vegetables give much more edible fat to the acre than does the cow with her milk and butter, or the pig with his bacon. The Chinese eat great quantities of vegetables, and are the finest gardeners in the world. Many of the Chinese and Japanese who have come to America are vegetable growers.

674. North China.—North China and Central China have less rainfall than South China and East China. Peking has a climate almost exactly like that of Omaha, Nebraska. In the sections of smaller rainfall, millions of people either do not know what rice is, or they regard it as a luxury. The farms there are planted in winter to wheat and barley, and in summer to soy beans, potatoes, sweet potatoes, corn, and millet, a grain that looks something like Kafir corn. Peanuts, a new crop for China, are also grown here. About 1895 an American missionary gave a quart of seed to some farmers in Shantung. The nuts grew well and quickly became an important crop in that province. The peanut industry is rapidly increasing in importance in China and Japan, as well as in the United States and Africa. The province of Shantung, the peninsula between the Gulf of Pechili and the Yellow Sea, alone produces enough peanuts each year to make five pounds for every person in the United States. Many of them are sent to this country.



Fig. 501. A ferryboat crossing a Chinese river. The boat is attached to loops which slide along a rope or cable made of bamboo fiber. What industry furnishes the cable we would use for this purpose?

675. **Fuel and wood.**—This land has had so many people for so long a time that very little forest is left. Houses are made of brick, with tile roofs and dirt floors. The Chinese have learned how to heat their houses with but little fuel. They have a very economical kind of stove called a *kang*. This is a wide, brick platform built along one side of the room and kept warm by a very tiny fire underneath. On the warm platform the people sit by day and sleep at night. The *kang* is often heated by burning straw, corn-stalks, or trimmings of fruit trees, and the ashes are carefully saved for fertilizer. A long time ago the Chinese invented a kind of fireless cooker.

To get wood the Chinese, like the Japanese, grow the bamboo tree as they do any other crop. (Sec. 655.) This plant, which grows with great rapidity, has a strong, hollow, jointed stalk, which the people, like the Japanese, have learned to use in numberless ways.

676. **Western ideas.**—About a hundred years ago there began for the people of Europe and America a period of time which may be called the Age of Science. Until that time we had nothing that China wanted, and her idea about wanting to be left alone was quite right. But now, like the Japanese, the Chinese begin to see that we have things that they want—new knowledge, new machines, new ways of doing things—so China has changed her attitude towards other nations. She is now sending her young men to the universities of America and Europe; she hires foreigners to come and teach in the Chinese colleges; she is starting schools to teach her own people the new knowledge. Not far from Shanghai there is even a college to teach tea-growing. The Chinese government has adopted a new alphabet of thirty-six letters to take the place of the Chinese writing, which has thousands of word signs. With this new alphabet the type-writer can be used, and a new school has been started at Peking to train teachers in the new way of writing.

Many of the people are cutting off the long queue, or plait of hair, sometimes called a



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Fig. 502. Native Chinese taxicabs in Hongkong. See the raincoat of long coarse grass, and the grass hat.

pigtail. They are even beginning to give up their native style of clothes for the less comfortable and less satisfactory kind that we wear.

677. **Western machines.**—Steamboats are replacing the junks on her rivers and canals. Automobile roads are beginning to replace the old trails where men trundled wheelbarrows and donkeys carried packs. Telegraph lines and new railroads are being built. Some Chinese farmers are changing from the old, old plan of growing nearly everything needed on each little farm. Instead, some farmers now grow only two or three things and send most of what they raise to market. Factories are being built and equipped with European and American machines. There are even large modern iron works at Hankow on the Yangtze which sometimes send iron to San Francisco.

678. **Government and army.**—After having been an empire for thousands of years, China has become a republic in name at least. It is a misfortune that China has as yet a very poor government. The Peking government has little power. In some of the provinces the people are ruled entirely by military usurpers, and sometimes there is a rival government at Canton.

After despising the soldier for centuries, China is, unfortunately, beginning to build, train, and equip an army, like the armies of



Fig. 503. A street scene in the older section of Canton. (Fig. 474.)

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Europe and America. She did this only after she had seen Russia take a part of Manchuria from her, Japan take Formosa, England take Wei-hai-wei and Hongkong, Germany take Shantung, and France take a corner of South China. If China should become organized and armed as Japan is, she might be much the most powerful military nation in the world. The United States has taken nothing from China, but has helped her all she could, and is regarded as her great friend. It is not only a duty of decency, but it is to the best interest of the people of the United States to see to it that China is so treated that she shall not become a militaristic nation.

679. Trade.—When the Chinese farm and home were so nearly self-supporting, the country had but little foreign trade. Before the World War the exports and imports were less than two dollars a year for each person, while in the United Kingdom they were over seventy dollars. (See Appendix.) Chief of all the exports is raw silk. Then come beans, bean cake, bean oil, and hides. Among their curious exports are firecrackers, which the Chinese are very fond of using, and dried eggs, which will, of course, keep a long time and can be carried easily.

The chief Chinese imports are cotton and cotton cloth, tobacco, iron, machinery to make manufactures, and oil for the family lamp. Even the Chinese peasant is willing to pay for a bright light. Most of the foreign trade of China is with Japan, England, and the United States.

680. Cities.—Shanghai, at the mouth of the Yangtze, is the greatest trade center—the New York of China. Ocean steamers go to Hankow, 600 miles up the Yangtze. Why should Hankow be a great city? Why is it called the Chicago of China?

The island city of Hongkong, now a British possession, is the center of the trade of south China and the Li Valley. Much of this trade comes by way of Canton, which, next to New York, is said to be the most crowded city in the world. Here thousands of people live in boats. Tientsin, the port of Peking, is the center of trade for North China. China has many large cities, most of which are in the district served by boats. Name the imports and exports of each port city. (Fig. 474.)

681. Future.—Some parts of China are so well cultivated that the land cannot be made to produce another thing. In parts, especially in the west, there is still unused land, and there may be some increase in Chinese agriculture. The great change in China will be in the growth of factories and in manufacture. Most of the things used in China are still made on the hand loom and the hand spinning wheel, and by other hand tools; but there are already 100,000 factory workers, and an American official says that in a few more decades there may be 40,000,000 factory workers. That would be only the proportion that we now have to the total population in the United States.

China is rich in resources for manufacturing.

China has more coal by far than all Europe, of which a supply is found in each one of the eighteen provinces of China Proper. Where there is coal, there is often oil; indeed, the Chinese have used a little petroleum for a long while. She also has iron, which has supported a primitive iron industry for many centuries, but the resources are almost untouched, and are said to be very rich. An iron mine on the Yangtze sends Japan some of the iron used in that country. The mountainous southwestern province, Yunnan, is famous for its mines of gold, copper, zinc, and other metals. She has so many people that they have never been counted; thus 320,000,000 is only an estimate.

With all these raw materials and all these workers at hand, and with a new education started, we may expect to see great changes in China in our own lifetime. The chief difficulty is a political one. Can China have a good government? Can she have peace? In this age of science and machinery, peace and good government are more important than ever before. American and European engineers are ready to help China with plans. American machinery is ready to chug in the mines, quarries, and fields, and to whirl in the factories. If China develops riches, it means riches for us too, through our trade with her. There is nothing to be gained from poor neighbors, and much to be had from rich ones. The lack of prosperity in Europe after the World War soon made hard times in the United States.

QUESTIONS

1. What great river of the United States resembles the Yangtze? of Egypt? of Austria? of Mesopotamia? How?
2. Of what value is the Yangtze to China?
3. Why are flood plain and delta soils so rich?
4. What rivers of southwest China have deep valleys?
5. Why is the labor of rice culture much more difficult in China than in Louisiana and Texas? (Sec. 51.)
6. What is meant by different grades of rice?
7. Why has it become a staple food used by people almost everywhere?
8. Why is it said to be a luxury in some parts of China?
9. Why is winter wheat grown in this region?
10. Where are the largest cities of China located? Why? Find a city near the Yangtze that might have been on the coast at one time.
11. What opportunities are there in China for an ambitious young American?
12. Why has China not become a modern nation like Japan?

13. Compare transportation facilities in China, as pictured in this chapter, with those with which you are familiar.
14. Imagine you had traveled in China and taken the pictures shown in this chapter. What interesting thing about that nation would you tell from each picture?
15. Why are the great powers of the world so much interested in China?
16. America and England have great coal fields. Of what importance are China's coal fields to them?
17. What countries have shared in the partition of China?
18. Name some modern discoveries in science that had been long known in China.
19. How has China been able to develop an ancient and an advanced civilization without foreign aid?
20. From the history of China, would you say that there is any reason for Europeans or Americans to look down on China?

21. What is a houseboat? Why do so many people in China live on them?
22. Take the shortest journey from Peking to London. Tell what countries and cities are passed through.
23. Why is not all trade with Europe by railroad?
24. Take machinery from Philadelphia, and oil from Texas, to Tientsin. What would each ship carry on its return trip?
25. The great Chinese famine of 1921, in the region of the upper part of the Hwang Valley, was caused by both drought and flood—drought in the upper region and flood in the lower region. Can you explain these conditions?
26. Explain how the same wind can bring death to China both by coming and by not coming. Also how it is the cause of her dense population along the southeast coast.



Courtesy Hollister Sturges

Fig. 504. A native Chinese boat on the Woosung, a river of the Yangtze delta, on which Shanghai is situated.



Fig. 505. A temple at Calcutta showing the wonderful development of native Indian art and workmanship. In very early times the Indians built entirely of wood and when they began to use stone they continued the same forms of architecture. Does your home county have any buildings as beautiful?

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THE MANCHURIAN REGION

682. A region like parts of North America.

—How wide is the Manchurian region? (Fig. 469.) How long? What countries own territory in it? (Fig. 471.) If we could move it over to eastern North America, in the same latitude, where would its bounds be?

In climate, this part of Asia is much like the part of North America bounded by the Great Northern Forests, the Atlantic Ocean, latitude 40°, and the Great Plains. The Manchurian Region is not quite so wide as this American region, but Hokushu and southern Sakhalin have the climate of Nova Scotia, and the plains of Manchuria have the climate of the northern part of the Prairie Corn and Small Grain Belt, and of our Northern Wheat Region. The harbor of Vladivostok is frozen in winter, but Dairen is open.

The islands of the Manchurian region and the parts near the ocean are for the most part forest-covered mountains. Central Manchuria is a great treeless plain, like the upper Mississippi Valley and the valley of the Red River of the North. North of the Amur are more mountains and forests, much like the forests of Ontario.

683. A new frontier.—

The Japanese, accustomed for centuries to the warm Rice Region, do not like cold climates. Therefore they only began to settle Hokushu, which means “northland,” in the last twenty years of the nineteenth century. This was about the time the Canadians began to settle Manitoba, and Americans were rushing into North Dakota.

Hokushu is, therefore, a real frontier, and quite unlike the Rice Region. Settlers are clearing the forests to make homes, and sawmills and papermills are using the timber.

To aid the settlers, Japan has established, in Hokushu, one of the finest agricultural experiment stations in the world. The farms here are four times as large as they are in the southern islands. This development is a part of the New Japan.

684. A region of riches.—The mainland of the Manchurian region is also a frontier and a land of great resources. Its coasts are rich in fish; its mountains are rich in forests. The Japanese are cutting much lumber along the Yalu River in northern



Courtesy U. S. Dept. Agr.

Fig. 506. First the elephant is crane to load the wagon; then he is tractor to pull it away. The “chauffeur” guides him by talking to him and by tapping him with the stick.

Chosen (Korea). The section near the coast and near the Amur has vast forests and very few people indeed.

Great riches of coal, iron, gold, and other minerals seem to be there, and coal mining is increasing rapidly, since Japan has had control of South Manchuria. Most of the wide plain of Manchuria has a climate that is good for beans and millet. It has cold winters, hot summers, and moderate summer rain

in the south, like Iowa; in the north the climate is like that of North Dakota and Saskatchewan. (Sec. 93.) Corn grows well in the south, and spring wheat in the north grows as it does in Minnesota and the Canadian wheat provinces. As yet but little of the land is used. How long is the plain from the Gulf of Pechili to the Amur River?

Trade is easy on this plain. Steamboats travel for hundreds of miles up the Amur and up its branch, the Sungari, even to Kirin in the midst of the wide plain, which is crossed by two railroads. There are large, rich coal fields in this plain.

685. Who owns Manchuria?—Manchuria is a great, rich, almost empty land, for which three peoples, the Chinese, Japanese, and Russians, have striven. China has long claimed Manchuria as one of her dependencies, but most of the time she ruled it about as we rule the Indians of Alaska. While China has become populous, Manchuria has remained almost empty, because it was beyond the Great Wall and exposed to nomads and bandits from Mongolia. Robber bands made Manchuria an unsafe place for a farmer and his goods. When Russia, pushing her armies through Asia, reached Manchuria, she obtained permission to build railroads through Manchuria and to police them. As policemen, she sent in armies and settlers. Then in 1904–1905 came the Russian



Courtesy Philadelphia Commercial Museum

Fig. 507. Chinese grain elevator. Do you see how these workmen in South Manchuria are raising the sacks of beans to the top of the heap?

war with Japan, in which Japan won. As a result, Japan now owns and polices the railroads of South Manchuria, and manages affairs there as though she owned the country. Most of the people are Chinese, but both Chinese and Japanese are going there, railroads are being built, and industry is thriving.

686. Future.—Will the rich resources of this promising land, which is larger than England, France, and Germany combined, be used? That depends upon government. If the people can have peace and good government, the land may become the home of as many people as are in Japan. It is the only large region of good, unused land in eastern Asia. Russia does not need this territory because she has the great and almost unused wheat region of central Siberia. Both China and Japan need the land as a place to which their people can emigrate. China's government is not well organized and she is not strong enough now to secure this land. Japan would like to have it and she may take it. She can keep order and she can use the land. She has shown this by the way the Japanese people are now settling the cold Japanese island of Hokushu, a land of forests, wheat, barley, oats, and potatoes. Since Japan took Russia's place in South Manchuria, the export to Europe and America of soy beans grown by the Chinese farmers has increased enormously.

QUESTIONS

1. Compare northern Korea and the highlands north of it with New England, in coast line, rivers, and industries. The industries here are most like those of which New England state? 2. Compare the cities with those of New England in number, size, and industries as carried on. 3. Do you think it will ever become the rich manufacturing country New England is? Why? 4. What natural resources has Manchuria that are lacking in Japan? What resources are there in Manchuria that Japan needs more than China?

5. Why is Mukden an important place? What kind of a place do you imagine it to be? Compare the cities of the Plain of Manchuria with those of Nebraska and Dakota in size, number, and characteristics. 6. What southern port is coveted by Russia? Why? Under which of the three nations contending for it would Manchuria be best developed? Which one, if any, do you think should have it? Why? 7. What export of Manchuria comes to America?

8. If Manchuria is developed, what kind of towns would you expect to grow up in the extreme northern part? What kind on the western boundary? Why?

9. Question for discussion: Fifty years from now the plain of Manchuria will be as productive as the Dakotas. Give arguments on both sides of the question. Compare Newchwang as it is to-day with what it may be fifty years from now. 10. Compare the effects of bad government and war in China, Manchuria, and the Balkans with good government in Denmark. Would Japan rather own a country like Denmark, or Manchuria? Give reasons for answer.

INDIA

687. Almost a world apart.—The peninsula of India pushes its great wedge of land into the warm Indian Ocean. On each of the two sides of the peninsula which lie along the Indian Ocean is a range of mountains, and between the ranges is enclosed a large plateau. Name the mountains. Arched around this plateau on the north is a long, wide area of low plain drained by three great rivers, all of which rise in Tibet. Name them. Beyond the plains three highlands wall India off from the rest of Asia: (1) the plateau of Iran is on the west; (2) the mountains of Burma are on the east; and (3) on the north are the towering Himalaya Mountains, so high and cold that no man has ever been near their tops. One party of explorers was driven down from one of

the Himalaya peaks, in the *summertime*, by a snowstorm that lasted for thirteen days. By distant observations surveyors have calculated the height of Mt. Everest, the highest mountain in the world. (Fig. 468.)

What a difference there is between the north and the south side of these mountains! On the north side lies Tibet, the highest plateau in all the world, cold, dry, and with but few people. On the other side of the Himalayas in India, one hundred miles away, there is quite another world. It is a low plain, very hot, very moist, and very green with growing things, and the people seem to be as thick as flies. You wonder how they all can make a living. India is only half as large as the United States, but she has three times as many people.

688. Climate and famine.—How can India feed so many people? India is a monsoon land. (Sec. 646.) All summer long, nearly every year, the southwest monsoon sweeps across the peninsula, carrying clouds and much rain, and making the air moist and the ground wet. In India, as in China, the monsoon adds the gift of moisture to the heat of summer, which makes it possible for the people to raise abundant crops on the fertile soil, and thus to support a population so large that India seems like a human hive. The damp, muggy, burning hot weather during the monsoon makes people from Europe or America think they are going to melt. In winter the prevailing wind is from the northeast. It blows from the land and brings but little rain; so there is a long season of winter drought. At this time, the air is dry, many of the trees shed their leaves, and the grass is brown and dead.

It is terrible for India when the monsoon fails, or is late, or stops for a time, as it sometimes does. Crops may then fail completely; famine comes. For centuries these famine years have come from time to time, especially in northwestern India. Then millions and millions of people have starved for want of even the cheapest food.

689. People.—Like China, Egypt, and Mesopotamia, India is a land of very ancient

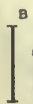


Fig. 508. Total populations in millions:

A. British India (1911) 315
B. United States (1920) 105

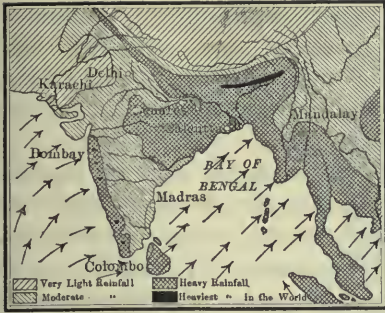


Fig. 509. The summer rainfall of India. How does this map show the need for irrigation, and the water supply for irrigation in the Lower Indus Valley?

buildings. But so many hundreds of years have passed since then that many of their palaces and tombs have become ruins.

About seventy per cent of the people are Hindus. Since they came down from central Asia their skins have become very dark, but they still have straight hair and features like those of their European cousins. The people in the Indus Valley were the last to arrive from Central Asia, and because they have not lived long in India their skins are nearly white. In southern India are the original natives and their skins are very black indeed.

Each succeeding conqueror always regarded those whom he was able to conquer as inferior. As one race after another thus became conquered, the people gradually formed into groups called castes. Those in one caste will not associate with those in another caste, and a child must stay in the caste of his father. The caste idea became the style. Consequently people of different trades are in castes; the blacksmith may not speak to the shoemaker, or the shoemaker to the ditch-digger. This caste system is a great bother, especially now when it is easy for people to travel and trade with each other. It keeps people from doing many things that we can do in America, where we believe that everyone should have an equal chance.

Many of the people of India were highly civilized long before the people of North Europe were. As workers, they have amazing skill, and make wonderful carvings of wood, metal, and ivory, and many other beautiful

civilizations. For ages one set of invaders after another have set up kingdoms in different parts of the country. These kings have made India a land of wonderful

things. Their country still contains some of the most gorgeous and beautiful buildings in the world. (Fig. 505.)

690. Government.—Just as Europe has many small countries, such as Switzerland and Holland, so India has many kingdoms and empires. Thirty languages are spoken. Since 1774 England has ruled over India, and has kept the native states from fighting each other. Many of the native states still keep their own rulers, just as each of our own states has a governor; but the King of England sends out a governor-general, or viceroy. This governor-general and his council really rule India, for the native princes must obey them. But the native princes attend to local government, and make much show with palaces and processions, jewelry and bright clothing.

Since England began to keep order in India, many railroads have been built, and the country has some factories and a heavy foreign trade.

691. India has four natural divisions:

First, the slopes of the Himalayas;

Second, the moist plains of the lower Ganges and Brahmaputra;

Third, the drier plains of the Indus Region;

Fourth, the plateau of Hindustan, and the island of Ceylon.

692. The Himalaya slopes.—The Himalaya slopes, too small to show on the map, have all kinds of climate, from stifling tropic heat at the base, to glaciers and unending snow at the top. These slopes have a terrific rainfall. As the moist monsoon from the Bay of Bengal goes up the steep slopes, the water fairly pours out of the clouds. Forty inches of rain have been known to fall at one place in a single day, and 900 inches in a



Fig. 510. The winter rainfall of India. What is remarkable about the rainfall of Ceylon? (Fig. 509.)



Courtesy Ludlow Manufacturing Associates

Fig. 511. Weighing jute in a Calcutta warehouse.
What is the chief use for this fiber?

single year; the average for some districts is over 400 inches a year. In some places the mountain is just bare rock, because all the soil has been washed down into the Ganges plain. Like the Great Valley of California, the Ganges plain is made up of soft earth thus washed down by the mountain streams.

693. The Ganges and Brahmaputra valleys.—The monsoon seems to swing around the plateau of Hindustan and up the valley of the Ganges, making it, too, a land of heavy rain (Fig. 509), but not so heavy as the rain of the Himalaya slopes. The lower Ganges valley is called Bengal. Millions of dark-skinned farming people make their living on this plain as the people do on the plains of China. Two crops suited to wet land are the leaders here: rice to eat, and jute to sell. The rice is grown as it is in China and Japan (Secs. 654, 672). Jute is a tall, reed-like plant which has in its stalk the cheapest of all important fibers. It is made into burlaps and gunny sacks, the coarse sacks and bags which are much used throughout the world to hold grain and coarse materials. In Calcutta, the great city of the Ganges delta, many factories are making burlap, and many ships go down

the Hoogli River (Fig. 527) carrying bales of burlap and bales of raw jute to every continent. The lowlands of the Brahmaputra, in a section called Assam, are much like those of the Ganges.

On the higher lands of Assam, English companies have developed many large tea plantations with the aid of native workers.

694. The Indus region.—In northwestern India, a part of which is called the Punjab, the plain between the Himalayas and the sea is much wider than the plain in Bengal.

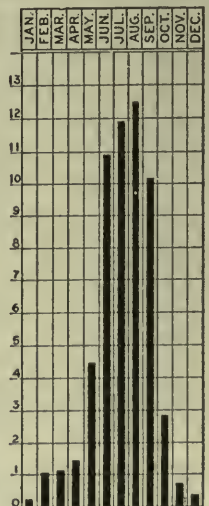
The Indus plain is level, wide, and hot. The monsoon does not blow here as strongly as it does farther east, and it makes but little rain until it reaches the Himalayas. (Fig. 473.) The wide, almost rainless stretch east of the Indus is called the Thar, or Indian desert, but streams flow down from the deluged mountains and form the Indus, which flows through a land of little rain.

Instead of the rice and jute of the lower Ganges valley, the Indus region produces wheat and barley. These crops grow between November and March, but the scanty, irregular rainfall makes the crop uncertain. In good seasons, the fields of the upper Indus produce wheat for export from the wheat port of Karachi.

For thousands of years people have irrigated land in the Indus valley. Hundreds of thousands of farmers are working year in and year out, irrigating their little bits of land from wells, as they do in the M'zab. (Sec. 579.) Under the English government, large, ancient irrigation works along the rivers have been rebuilt, new ones have been made, and still others are planned.

695. The plateau of Hindustan makes up most of

Fig. 512. Tropic monsoon rain, Calcutta, India, 61.76 in. per year. Which season has the land wind? Which the sea wind? Why is this a good rice region?



the peninsula. It is deluged with rain where the monsoon strikes the Ghats Mountains on the southwest coast. (Fig. 473.) Farther inland it is dryer, and the plain is covered with grass. Here the farmers grow the drought-resisting crops of sorghum and millet. These grains (Sec. 108) have tall stalks and small, round seeds. They are grown on millions of acres of ground, for they are the main food of millions of men and millions of cattle. This partially dry region furnishes a large part of the world's supply of goat skins, many of which go to the American tanneries and shoe factories.

Inland from Bombay is a large area with



Photo. Doubleday, Page & Co., N. Y.
Fig. 513. Tapping rubber trees on a Ceylonese plantation.



Photo. Publishers' Photo Service, N. Y.

Fig. 514. Adding sections to a ferryboat of inflated bullock skins on one of the headwaters of the Indus River. Compare with Fig. 501.

a rich black soil made of decayed lava. (Sec. 130.) Because of the climate of India, this lava plain becomes a land for cotton, and India is second only to the United States as a cotton exporter. The cotton is shipped from Bombay, the chief trade center of the western part of the plateau, and from Madras, the trade center of the east coast.

Many peo-

ple on this plateau make their living by raising crops that require much labor, such as drying the fruits of the myrobalan tree to make tanning material, gathering gums from the trunks of forest trees to make varnish, and picking castor beans to make oil. Much castor oil is now used in airplane motors. Bombay has a great export of oil seeds.

696. Ceylon.—Ceylon differs from most parts of India in having heavy monsoon rains on one side and trade wind rains over on the other side when the monsoon is not blowing. The well-watered highlands of the interior are tilled by scientific farming on a large scale. The farming is managed by white men, but the work is done by dark-skinned Ceylonese, and also by thousands of very black workers from southern India. Coffee was raised in Ceylon until blight killed the trees. Then tea was raised, but the crops were so large that the price went down. Rubber was tried next, and so much was raised that the price for it, too, has gone down.

On the coast lowlands of both Ceylon and the mainland of India are vast quantities of coconuts. They come to Europe and America as coconut oil, as dried meats (copra) ready for crushing, or as shredded



Fig. 515. Hauling iron pipe in India ninety miles from a railway. Can this cart, going ten miles a day, give a cheap freight rate?

coconut. Many steamships stop at Colombo on the voyage between Singapore and Europe and America.

697. **Animals.**—India, with its many kinds of climate, has a great variety of animals. In the dry parts of India the camel is used. In the wetter sections the water buffalo does the work, because he will work in the mud. Whenever the buffalo gets a chance, he will lie down in the mud and bury himself in it up to his eyes, in order to keep cool and escape the flies. Most of the plowing in India is done by zebus, a kind of cattle (Fig. 520). Can you tell why? (Sec. 527.) These animals are white, with large humps on their necks. In some places the elephant plows and pulls wagons, but he is most useful at lifting heavy logs in lumber yards.

The Indian jungles have many wild animals, including the elephant and the tiger. The latter sometimes kills people. Thousands of people are killed each year by the cobra, the deadliest of the many poisonous snakes of India.

698. **Trade of India.**—The chief import of all India is cotton cloth, most of which comes from England. The United States supplies some iron, hardware, machinery, and petroleum. Ceylon is a heavy importer of rice, but in ordinary years, except for the import of sugar, the rest of India feeds herself. What are the exports? (Secs. 693 to 696.)

699. **Future.**—Agriculture, which is the occupation of most of the people of India, is

of the intensive kind, but there are still large stretches of forest and jungle where tigers and wild elephants live. This land may be made into fields. If the land is rough, it can grow various tree crops in which hot countries are already rich. Rubber, tea, coffee, coconut, nut-yielding palms, myrobalans, and various spice trees are now used. There are also many others as yet but little used, which will yield large crops.

India might use much better methods of growing crops. On the Indus alone, five new irrigation enterprises now planned will provide water for six million acres of rich desert land, an area as large as Maryland.

India is beginning to manufacture. Native companies have built great storage reservoirs in the Ghats Mountains. These furnish water power at all seasons for many cotton mills in Bombay. Additional water power may be developed in the Ghats and also in the Himalayas, where the streams come



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Fig. 516. Giant bamboo grown as a crop in Ceylon. Compare this with Fig. 164.

down thousands of feet from the plateaus of Tibet.

Although India is beginning to manufacture, it must be remembered that she is in the part of the world that belongs naturally in the zone for producing raw materials. India is hot. It is not so easy to work where it is hot as where it is cool. So the people do not do as many things as people in the stimulating climate of colder lands. (Secs. 207, 416.) One season the rice growers of a district in Ceylon had a crop big enough to last two seasons; so they did not plant rice the next season, but loafed the whole year and ate up what they had. In the third season the crop failed, and the people had to beg the government to save them from famine. In such a country one of the great problems of the government is to prevent famines. (Fig. 550.) Irrigation is helping to do this, and so are the railroads which carry food from regions of good crops to regions where crops have failed. India has many railroads, but they are so far apart that she needs many more.

QUESTIONS

1. Point out the thickly populated centers and tell why they are so located. Why is the valley of the Ganges a more densely populated region than the valley of the Indus? What cities of India would you like to visit? Why? 2. Locate on the product maps of India (Figs. 517-519) the chief producing regions. 3. Compare a wheat-harvest scene in India with one in Dakota under the following topics: time of year;

farming implements; workers; shipping. 4. What are the natives doing in Fig. 513? Why is it necessary to do this with great care? 5. If India's caste custom should be changed into Denmark's cooperative system, what progress would result? (Compare Secs. 689 and 465.)



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Fig. 517. India's cotton acreage. See how it avoids the wet Ganges Plain as it avoids the wet Gulf Coast (Fig. 30).

6. Of what country do the thickly populated river valleys of India make you think?

7. Why does India export her raw material and import cotton cloth? Why so much cotton cloth?

8. To what city of Scotland does Calcutta send large quantities of jute? (Sec. 423.)

Show the journey on the map by way of the Suez. Is any product of India used in your neighborhood? 9. Describe a forest scene in India. Compare it with a scene in the Great Northern Forest of North America from the following points of view: kinds of trees; nature of forest growth; flowers, birds, and animals. What modern invention has raised the value of one of India's resources? 10. Compare the four sections of India, using the following chart as a guide:

TOPIC.	GANGES REGION.	INDUS REGION.	SLOPES OF HIMALAYAS.	CEYLON.
Soil.....				
Climate.....				
Rainfall.....				
Amount.....				
Time of year.				
Surface.....				
Crops.....				
Transportation facilities				
Chief city....				

11. Give two reasons why the effect of the monsoons is more noticeable in India than in any other place in the world. 12. Why does the southeastern tip of India have winter rain? 13. Have people in your neighborhood ever given any money to aid famine sufferers in India? What



Finch & Baker, U. S. Dept. Agr.

Fig. 518. Acreage of India's rice, a wet-land crop. (Fig. 509.)



Finch & Baker, U. S. Dept. Agr.

Fig. 519. Acreage of grain sorghum and pearl millet. Compare the location of these drought-resistant crops with the rainfall (Fig. 509) and with the rice areas (Fig. 518).

causes the famine? What might be done to prevent so much distress? 14. Why have the people of India allowed their country to become a colony? Compare them in this respect with the Chinese; with the Japanese. 15. Since India has been under British rule, which has gained more, India or England? Give arguments on both sides. 16. Compare the expenses of living in India with living in the United States from the standpoint of clothes, houses, food, and wages of a cook. Why is there any difference? In which place would you prefer to live? 17. There is much unused water power in the Himalayas. Would you rather own a power plant there or one near Niagara Falls? 18. What writer of English literature has caught the spirit of this hot jungle land as no one else has? 19. Dramatize sections of the story of Mowgli from *The Jungle Book*. 20. Suppose you were a jungle boy in India, what would you do to become happy and prosperous?

FARTHER INDIA AND INDO-CHINA

700. Bounds and area.—Farther India and Indo-China comprise the southeastern corner of Asia east of India, south of Tibet and China, and north of the Malay peninsula. How many miles long is this land? How wide? Compare it in size with Florida Peninsula (Figs. 10, 26); with the United States. It does not look large on the map, but it has one-third as many people as the United States. Most of the inhabitants are dark brown or black, and they are worshippers of Buddha.

Burma, in the west, belongs to England, and

is ruled by the governor-general of India. Burma is larger than the whole United Kingdom.

The French possessions in the eastern part of the region are larger than France and have nearly half as many people. Between the French and the English colonies is the independent kingdom of Siam, from which both England and France have, from time to time, taken large slices of territory. Siam is, nevertheless, larger than the United Kingdom, with about as many people as Pennsylvania.

701. Climate, character, and trade.—The northern part of this region has many mountains, from which four big rivers flow down through wide, hot, tropic valleys, having stretches of forest here and there. Like the Plateau of Hindustan, much of this region is grassland, for it has the same kind of rainfall as India. What is that? Much of the land, even in the valleys, is unused, and many strange animals are caught here for our zoölogical gardens. Most of the people live along the streams and especially on the deltas, where they can irrigate the land to grow rice, as the people do along the Ganges and the Yangtze.

This is an easy place in which to live. People do not need fire except for cooking. A grass house is warm enough. Little children go naked, and grown-ups need but

few clothes. There are quantities of fish in the rivers. The warm weather makes food grow easily; so why work, or why worry? It is no wonder the people are not as industrious as they are in Scotland, or Sweden, or the United States.

The chief exports of this land of easy living are rice and teakwood. Teakwood is much used for the wooden parts of steel ships. These exports are of the kind that come from places with scanty population and plenty of resources. This



Fig. 520. Logs of teakwood in the streets of Bombay. Where is the dinner for the hump-necked zebu (Indian cattle)?

corner of Asia furnishes nearly all of the world's exported rice. It goes out by shiploads each year from four ports, each at the mouth of a southward-flowing river. Name the ports and the rivers. (Fig. 474.) This rice is grown by natives and floated in native boats down the muddy rivers to the big rice-cleaning mills owned by Europeans or Chinese.

702. Future.—This region is like Manchuria in having room for many more people, provided some one can give good government, and build and operate railroads, large irrigation works, and other big enterprises. The English and French are already doing this in their parts of this region. Apparently things will have to be managed, for a time at least, by people from some cooler climate, for such people like to do active things. Perhaps the energetic Chinese will help. Already they have gone to Siam by hundreds of thousands, and have taken possession of nearly all the industries of the country, because the easy-going natives are not so willing to work as are the Chinese.

QUESTIONS

1. Name the greatest rice exporting ports in the world. 2. What in Siam's location influenced her to join the Allies in the World War? 3. Would you rather live in a tropical land where all your needs are easily supplied by nature, or in a frosty land where you must work hard to live? Why? In which are the great civilizations found to-day?

4. Name the principal rivers of Indo-China, the countries in which they flow, and the ports to which they carry freight. Why is the Brahmaputra such a winding river? 5. In which part of this region can the natural difficulties of travel be most easily overcome?

6. What cities of the United States, of Germany, and of Great Britain use teakwood? 7. How does pleasure-travel in this region compare with travel in desert regions and in the country north of the Caspian Sea? Which would you prefer? Read Kipling's story about Toomi of the Elephants, in *The Jungle Book*.

THE MALAY PENINSULA, EAST INDIES, AND THE PHILIPPINES

703. Bounds and character.—Between Asia and Australia lies a world of water dotted with thousands of wet islands, calm, silent, and almost black with forest. Many of them undisturbed except for the low buzz of insects, the voices of birds, and the mur-



Courtesy Philadelphia Commercial Museum

Fig. 521. Carabao, or water buffalo, drawing a bamboo sled on which children are riding. At what season is this better than a wagon on the level Philippine plains?

mur of waves upon the shore. Some of these islands are no bigger than a hat, others are larger than Texas, with rivers larger than any on our Atlantic slope. Heavy rain falls throughout most of the year; so nature everywhere covers these islands with rank-growing forests, so tangled that one often has to chop paths to get through. Along these coasts are many hidden rivers creeping out through swampy forests. On the hidden rivers are hidden villages, and men whom we may call "wild". There are whole tribes here who never saw a white man.

In this region the hot, damp climate makes the forests grow so quickly and so thick that man has used but little of the land. In all Borneo, an island five times as large as New England, there is not as much land under cultivation as in two counties of Illinois, although in some other parts of the East Indies an intensive agriculture has been developed.

704. People and history.—A long while ago this was a region of the black man, but the ancestors of the brown Malays sailed out from Asia and took possession of most of the coasts west of New Guinea. In some of the islands, tribes of black men still live in the interior. In New Guinea, the people are very black, and have kinky hair like the natives of Australia and central Africa. This island is larger than Borneo, but we

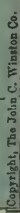


Fig. 522.



© Publishers' Photo Service, N. Y.

Fig. 523. Rafts of unhusked coconuts floating down a Philippine river.

know little about it, partly because it is densely forested and unhealthful for white men, and partly because of an unpleasant habit of the natives, who sometimes eat explorers who come to their country. The Malays have never settled in New Guinea.

While Japan, China, India, and Europe were building great cities with beautiful temples, the Malays were satisfied to live in villages along the river banks. Their houses are grass huts erected on poles so as to be away from mosquitoes and wet earth. They live by fishing, hunting, and tending small gardens. The chief recreations are boating, swimming, and fierce tribal wars. The victorious warriors often carry home the heads of the defeated and offer them as sacrifices to their gods, or hang them up in the house as ornaments.

What European nations now control parts of this wide region? (Figs. 10, 471.)

705. The Dutch East Indies.—For over a hundred years the Dutch government has ruled or claimed more than half of the East Indian Islands; but most of their attention has been given to Java, where the European rulers have kept peace among the different Malay tribes and have really ruled the

country. Each tribe still has its own native sultan, who is clothed in gorgeous raiment and lives in much pomp and style; but there is a Dutch "adviser," who wears a white duck suit and lives very quietly, but who really rules through the sultan. With the Dutch keeping order, the population of Java has increased almost as fast as that of the United States, and this island, but little larger than New York State, has three times as many people.

Nearly all the Javanese are farmers. They cultivate small patches of land almost as carefully as the Chinese do. The chief export of the island is sugar. The government compels the people to raise rice for two years and sugar for one year, so that there may be plenty of food as well as something to sell. (Secs. 672, 383.)

The next great export is tobacco. The other products of Java, like the products of Japan and China, are the result of much labor. Tea and rubber are grown, and rattans and varnish gums are gathered in the dense forests. Two other important products are pepper, the hot seed of a climbing vine, and cinchona, the bark of a small tree that is grown on hillside plantations.

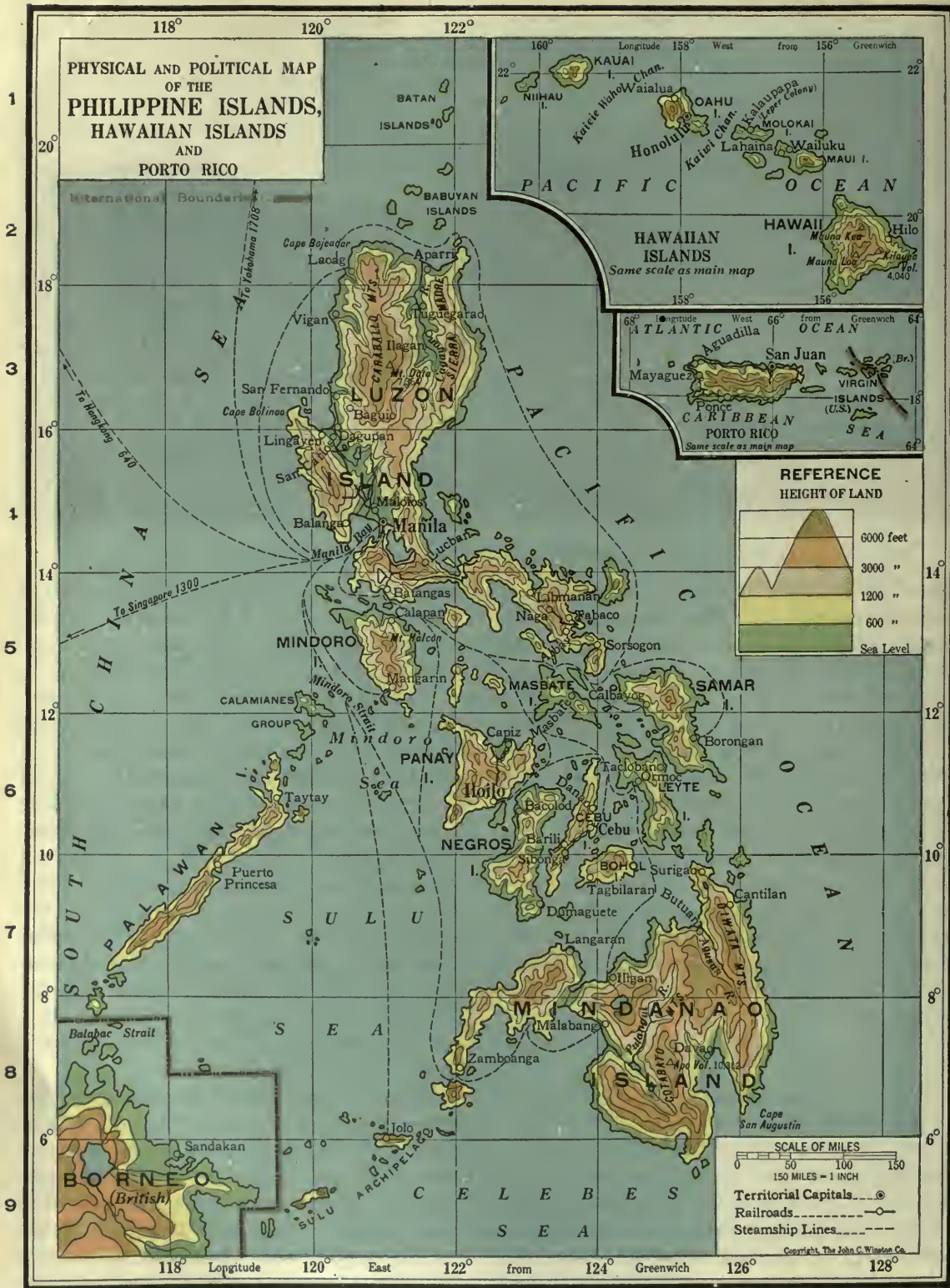


Fig. 524.

Quinine is made from ground cinchona bark.

No other large part of the East Indies is at all densely peopled. Sumatra, three times as big as Java, has less than one-sixth as many people. If you have seen many automobiles you have seen some of the rubber that is grown in Sumatra and used in the tire factories in America. One American company owns plantations reaching farther than you can see, and worth many millions of dollars. The work on these rubber plantations of Sumatra is done by immigrants from Java and China, working under Chinese and Dutch foremen.

The Dutch part of New Guinea is as little used as any other part of New Guinea. The large islands between Borneo and New Guinea are for the most part uninhabited, although many coconuts are produced along their shores. At Makassar in the Celebes is a great European-owned coconut oil mill, where oil for the European market is crushed from nuts brought in by native boats and small steamers.

706. British possessions.—The chief British possessions, called the Straits Settlements, are Singapore, Penang, and some other little spots of land along the coast of the Malay Peninsula. But England also rules, indirectly, the native states of this peninsula, very much as the Dutch rule Java.

The native of the Malay Peninsula cannot be hired to do a day's work for any money. He catches a few fish, and his wife raises rice and vegetables in the garden and has a little surplus to sell. The money so gained is enough to buy the few things the Malay wants; so he swims, paddles about in his canoe, and sits in the shade watching the Chinese work.



Photo. Underwood & Underwood, N. Y.

Fig. 525. A Philippine mountainside turned into giant water steps, or terraces, by a remarkable series of ricefields made by the Igorrotes, one of the mountain tribes whom some people call savages.

England has let the Chinese come to these colonies freely. They do nearly all the work that is done in the Malay Peninsula in the tin mines and the rubber and pepper plantations, and they also run nearly all the retail stores. With the money they save they buy land, and now own many of the large rubber plantations. There are many rich men among their number, for the Chinese are both good workers and good business men.

Singapore (Sec. 438) is a great center for the rubber trade of Sumatra and the Malay Peninsula, and also for pepper and the other spices that are grown in this region. For the first two or three years while the trees are getting started, pineapples are often grown in the young rubber plantations. This industry makes Singapore a great center for the export of canned pineapples grown by Chinese workmen, usually under the employ of Englishmen, but sometimes under Chinese management.

707. The Philippines are America's chief foreign possession. Altogether there are 7,083 of these islands, and both their area and their population are greater than those



Courtesy U. S. War Dept.

Fig. 526. An advanced class in stenography in the Philippine School of Commerce.

of all the West Indian Islands combined. (Fig. 524.) Find the place on the eastern coast of North America having the same latitude as the northern and southern ends of the Philippine group. Compare Luzon and Pennsylvania in length. Most of these islands are mountainous, many of them are volcanic, and the heavy rainfall makes them naturally forest covered. In Luzon, which is nearly as large as Virginia, there is a large low plain north of Manila. It is crossed by a railroad 120 miles long, and has many ricefields and sugar plantations. The valley of the Cagayan River at the north end of Luzon has an important tobacco industry.

708. The Philippine people.—The people calling themselves Filipinos are of Malay stock, but many tribes of dark-skinned people live in the forested mountains of the interior. Some of these tribes are wild people of the forest, but others are farmers, who show great skill at terracing their hillsides. (Fig. 525.) There are also enough Chinese to take charge of most of the buying and selling in the cities and towns.

Spain had the Philippines for three centuries, and during this time the Filipinos became a civilized people, speaking Spanish. The islands became a United States possession in 1899. The American Congress has tried to help the Philippines by (1) giving a just government in which the Philippine congress makes most of the laws; (2) establishing many public schools, where English is

taught; (3) building railroads and roads; (4) organizing a department of agriculture to teach the people how to grow crops. These four things have greatly increased the prosperity and comfort of the people of these islands. The Philippines probably have more people who can read and write than all the other East Indian islands combined. There is a university at Manila, and many intelligent Filipinos also come to America every year to complete their education.

The city of Manila, with a population larger than any city between Baltimore and New Orleans, has many wholesale stores, factories making things for local use, and coconut oil mills and cigar factories making products for export.

709. Philippine agriculture.—Most of the people are farmers who cultivate small tracts of land near their houses, which are often of grass. A small plot with sweet potatoes, bananas, beans, and vegetables furnishes nearly all the food a family needs. Many of these farmers have groves of abaca plants. This is a cousin of the banana, and has in its pithy stems the very long, strong fibers called Manila hemp, much used for rope and for binding up the sheaves of wheat. Abaca grows well in rainy, damp, hot places, with well-drained soil, of which the mountainous Philippines have many, because they have the monsoon rains in summer and the trade wind rains in winter. Abaca is a fine money crop for the Philippine farmer, and so is the coconut. This most useful tree lives for a hundred years without cultivation, and yields good crops of oil-giving nuts that will keep for weeks after they have fallen from the tree.

The farmer's wife often makes money weaving by hand, from native fibers, hats much like panama hats.

710. Foreign trade—Exports.—The Philippine exports have increased severalfold since America took possession. The chief exports are Manila hemp, or abaca, coconut products, sugar, tobacco, and hats.

711. Imports.—In this region, as in India, the chief import is cotton cloth, needed by all for clothing. Next come machinery and

hardware necessary for their simple agriculture, and oil to light up the long evenings, where the night is nearly as long as the day. While rice grows throughout this region, some parts do not grow enough for their own use, and the Philippines regularly pay for rice from Indo-China with money that comes from hemp, copra, sugar, and tobacco sold in the United States. (For trade, Fig. 522.)

712. Future.—The teeming millions living comfortably in Java show that this little-used East Indies, a land of heavy rain and dark forests, is one of the places where many resources may be developed and where many, many more people may live. Even in Java, with its heavy population, the land is by no means all used. It still has forest areas so large that the wild elephant and the wild rhinoceros roam in them. Some authorities think Java might support a hundred million people as comfortably as it now keeps thirty million.

The rapid increase of people and of trade in Java, in the Malay peninsula, and in the Philippines shows what may be done in this region if someone keeps order and provides government that is more just and more helpful than the natives have provided for themselves. The trade of the settled parts of this region shows that if population increases, the things that we may buy will increase, such as rubber, hemp, sugar, spices, coconut oil, and many other tropic products which the fruitful soil and climate will help men to grow if they will work two-thirds of full time.

If these people have things to sell to us they also will buy things from us. One of the surest ways to make life easier in our own country is to have other countries pros-

perous, so that they will have things to sell to us, and thus get money with which to buy things from us.

QUESTIONS

1. In what respect are the natives of the East Indies and the Philippines similar to the North American Indians? How are they different?
2. Which of the sports here would you enjoy? Which would you prefer not to take part in?
3. For what three reasons has exploration been slow in the East Indian Islands?
4. Name the most important islands, and tell to what country they belong.
5. What is the secret of Dutch success in Java? What product might you see in the United States transported as coconuts are in Fig. 523?
6. Which island would you most enjoy visiting? What would you do there?
7. Why are England's possessions in this region very important?
8. Name the uses to which Manila hemp may be put.
9. What is meant by ruling these island people "indirectly"? Give an example.
10. Why is Java the most thickly populated island?
11. In what season do the trade winds blow upon the Philippines? What is its direction?
12. Use the following diagram to tell the locations of and the exports from Singapore, Batavia, Manila, Surabaya, Makassar:

CITY.	COUNTRY.	ON WHAT WATERWAY?	RULING NATION.	EXPORTS.

13. Why is there so much rainfall in this region?
14. What other regions that you have studied have climate most nearly like that of the East Indies?



Courtesy Philadelphia Commercial Museum

Fig. 527. Shipping at Calcutta on the Hoogly River, one of the mouths of the Ganges. To what use do you think each kind of boat is put?

15. Look up East Indies in an encyclopedia. Find out how these islands were formed. 16. Give all the evidence of progress in the Philippines since 1899. (Fig. 526.) 17. If you were a Filipino would you rather be free, or a subject of the United States? Give three good reasons for your answer.

THE TRADE OF ASIA AND THE EAST INDIES

713. Barriers to travel.—Europe (Sec. 608) is favored with natural waterways and with a surface which makes it easy for ocean steamer, river boat, or railroad to reach the heart of the continent. Asia is quite different. Most of her vast area is a big block of land, shut off on the north by the Arctic ice, and on the south by the awful barrier of mountains and high, wide, and dry plateaus.

714. Caravan trade.—For thousands of years, while the people of Europe have been skirting the shores of their continent in ships, and boating on the rivers, the natives of Asia have been climbing mountain canyons and following desert trails with caravans of camels, donkeys, and mules, making long, slow, hard journeys, such as those from India to Persia, from India to China, from Peking to Moscow, or from the upper Yangtze valley to Tashkend. Indeed the camel has been a common sight from Peking to the plains of India and westward to the Crimea, to Con-

stantinople, and the Strait of Gibraltar. Even the sheep that come down from Tibet to India to market sometimes bear twenty-five-pound bundles on their backs.

715. Canal boat trade.—The caravans have carried the articles of trade to the most distant places, but we must not forget that the greatest trade of all Asia has been carried in the thousands and thousands of Chinese junks. For several thousand years the patient Chinese have been tugging these boats up the rapids of rivers and along the hundreds of canals that have been dug in the plains of China.

Asia had also an ancient sea trade. In the time of King Solomon the Arabs sailed eastward to India with the southwest monsoon. They learned much from the Hindu while they traded and waited for the northeast trade wind that would take them home to Arabia. Even now we call the seasonal winds of India the "monsoon," from an Arabic word meaning season. The trade wind also got its name because it brought these ancient Arabs home from trading trips. The figures 1, 2, 3, etc., that we use in arithmetic, are called Arabic figures, but the Arabs learned them from the Hindus on those ancient visits. Asia is old and she has given us much.

716. Railroads.—Asia was slower than Europe in starting railroad building, but she is already possessed of the longest route in the world, the Trans-Siberian railroad. It gives service in times of peace from Dairen and Vladivostok to Irkutsk, Omsk, Moscow, Petrograd, Berlin, and Paris. It is as far from Vladivostok to Omsk as from New York to San Francisco, and that is but little over half way to Petrograd. What parts of Asia have the best system of railways? (Fig. 529.) Asia has need of many thousand miles of railroad.

717. The great ship route.—The chief trade route of Asia is the ship route skirting her southern shores from Suez to Yokohama. (Fig. 9.) The opening of the Suez Canal (1869) helped the trade of Asia by giving a shorter route to Europe and the Atlantic coast of North America. The Panama Canal opened



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Fig. 528. Why are these two natives of India making signs to each other about the fruit? (Sec. 689.)

(1914) a similar gateway for the trade of eastern Asia with the eastern coasts of the United States. Vessels now go around the world freely, going from Europe and eastern North America to Japan by way of the Caribbean Sea and the Panama Canal and returning by way of southern Asia and the Suez Canal.

718. Character of Asia's trade.—Asia sells chiefly the things that men produce with much labor rather than with much land. Such are tea and silk, the chief exports of Japan and China; jute, from India; rubber and spices, from Ceylon and the East Indies; hemp and tobacco, from the Philippines. The oil seeds, nuts, bark and other tanning materials from India can be produced only by much labor. Only in a few places do we get the products of the wide fields, such as the wheat of Siberia and of the Indus Valley, the sugar of Java and the Philippines, and the cotton of India, the rice of Indo-China, and the beans of Manchuria.

In the wool, sheepskins, and goatskins we see the products of dry lands and high lands, and in the great export of India's hides and cotton we see the lack of manufacturing industry in that country.

In return for these things Asia gets first of all cotton cloth, chiefly from England, for simple clothing; and raw cotton, chiefly from the United States, to be used in their new cotton factories. Second in importance come iron, machinery, hardware, and tools. Even the simplest farmer needs a hoe and a knife. Almost every Asiatic would like to ride a bicycle, and many already listen with pleasure to the phonograph. Kerosene for the family lamp is another great import of Asia.

719. Future trade of Asia.—There is

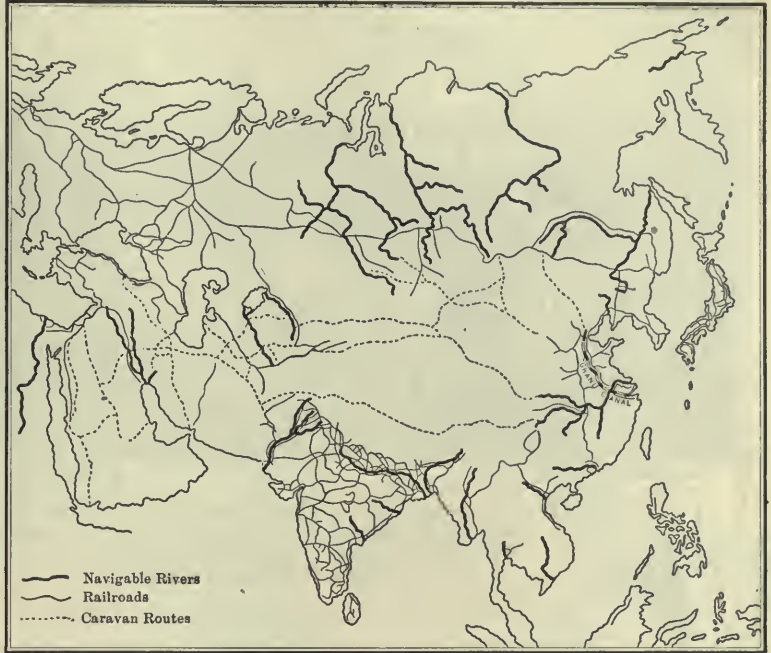


Fig. 529. The railways and leading navigable rivers of Asia.

every prospect that Asia and the East Indies will advance in both agriculture and manufacture. When she does, Asia's trade with us will increase, for her factories will be equipped with modern machinery and as the people increase in riches and wealth they will more and more buy from us the things that they do not grow or make, and more and more will they send to us the things that we do not grow or make. The greatest trade in the world is the trade between rich manufacturing countries, such as that between England and the United States, England and France, and the United States and Japan.

QUESTIONS

1. What articles in each of the following classes do we get from Asia: food; clothing; medicine; condiments; machinery; tools? 2. Are there any articles in any of these lists for which we are entirely dependent upon Asia? 3. Make the same kind of a list for the things which Asia must get from us.

4. Compare the canals of Asia with those of Europe: of the United States. 5. A ship from New York is making a trip around the world. Name the port or ports at which she might gather freight from each of the regions of Asia of which at least a part of the area drains into the Pacific or Indian ocean. (Fig. 9.)

6. In which country of Asia would you prefer to travel? to live? 7. Do you think Asia's trade will increase or decrease? Why? 8. What imports may increase? What exports? What may decrease?



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Fig. 530. Ostriches in a pasture field in South Africa. The ostrich is one of the most recently domesticated animals. For what are these birds chiefly raised? (Sec. 774). How do changing fashions affect the ostrich farmer?

AFRICA SOUTH OF THE SAHARA

AFRICA — THE CONTINENT, PEOPLE, AND HISTORY

720. The separateness of North Africa.— You remember that we have already studied North Africa when studying Europe and the Mediterranean Regions. (Secs. 540-567). Africa, north of the Sahara, is really a part of the Mediterranean world in peoples, history, government, and trade. We commonly think of Africa as the continent of the black race, but black man's Africa really does not begin until we get south of the Sahara. This desert is one of the greatest barriers in the world. It has always been hard for men to get into North Africa from Central Africa, but very easy to get there from both Europe and Asia.

721. Neglected Africa.— Since the time of Columbus the white man has sailed all seas and settled all continents, but he has made less change in Africa, south of the Sahara, than in any other continent. He left most of it unexplored and called it the "Dark Continent" until long after he had made populous states in North America and South

America. It remained unknown because the continent was hard to enter. When men go into a new continent, they usually sail up the rivers. But African rivers have falls not far from their mouths, so explorers cannot take their ships to the interior.

Another difficulty is the scarcity of good harbors. See how smooth the African coast line is. It is much easier to enter a continent like Europe, where an irregular coast line makes many good harbors. Even worse, the coasts of Africa near the equator are wet and swampy and unhealthful. Such coasts long kept men out of Central Africa.

The interior of the continent also presented barriers to the explorers. There were terrors to be encountered in the belt of thick forests near the equator. In this unhealthful tropical jungle, wild beasts, poisonous insects, and strange tropical fevers waited to attack the traveler. The Sahara Desert, stretching from sea to sea, was most difficult to cross. Perhaps the worst barrier of all was the



Fig. 531.



Courtesy H. L. Shantz, U. S. Dept. Agr.

Fig. 532. A native African field meet. The marksman, dressed in his best suit of bark cloth, winning the archery championship.

nomad Arab of the deserts. He was a slave trader and was as ready to trade white slaves as any other. He was very hostile to the people of Europe during the time when America was being explored.

At last, by about 1880, when the other continents were all taken, Europeans, hungry for land, faced the perils of Africa and made the hard journeys which were necessary to enter and take the land.

722. Dividing up Africa.—Sometimes, to get territory, the white men made presents to a native chief. Having pleased him with beads, brass wire, bright handkerchiefs, and other trinkets, they would then make a treaty with him. He would promise to recognize England or France or Germany as his protector, and the protecting country was permitted to develop resources and open up routes of trade. There were some small wars, but most of the tribes, armed only with spears and bows and arrows, were too weak to resist the good rifles of the Europeans. Only the Abyssinians are entirely independent. The Basutos, whom we shall study about later, have remained almost independent.

723. How white men rule Africa.—On the maps great areas of Africa appear to belong

to various European countries, but in fact most of the people of Africa are still ruled by their native chiefs. For example, in the large British colony of Nigeria there is only one white man to every six thousand black men, but these few white men have somehow managed to rule. They stop most of the wars between tribes. Gradually the white men get more and more power. They run steamboats on the rivers. They direct the work of making hundreds of miles of railroad and telegraph lines. (Fig. 563.) They establish post offices and develop a large and growing foreign trade.

724. Trade and tribal life.—Railroads and steamboats have the same effect upon household industries in Africa as they do elsewhere.

The Africans are rapidly giving up their old tribal industries, which provided all the things they used.

Many of them are now selling a few things and buying many other things much as the rest of us do. They are as fond of phono-



Courtesy H. L. Shantz, U. S. Dept. Agr.

Fig. 533. The African woman does most of the work. These women are returning from their garden patch with native hoe and baskets of produce. Most of Africa's burdens are carried on the heads of the bearers.

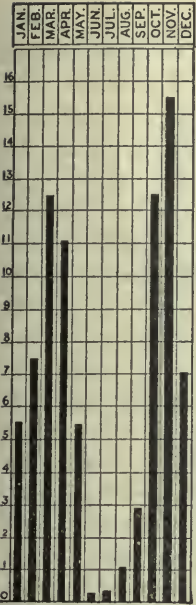


Fig. 534. Equatorial type rainfall of Gabon, West Africa, African coast at equator, 90.88 inches per year. When does the forest man burn the brush in his new garden? When does the sun cross the equator? (Sec. 746.)

much unused land in Africa that many wild animals are found there. Among them are the elephant, lion, rhinoceros, hippopotamus, zebra, giraffe, and gorilla, and many antelope and other large grass-eating animals. It is no wonder that naturalists and hunters like to go to Africa.

726. The climate of Africa.—What are the latitudes of the northern and southern tips of the continent? The climates of Africa show how much the northern hemisphere is like the southern. If we start from the forest-clad equator and go north or south along the west coast of Africa we find the same three belts of climate on the Atlantic coast north of the equator and on the Atlantic coast south of the equator. These regions having similar climates are alike because the laws of climate work in the same way in both northern and southern hemispheres. We shall understand the climate of Africa

graphs and toys as are any other people. 'When a people joins in world trade, the trade wipes out the household industries. (Sec. 3.) It is also easier for the white men to rule the natives when they depend upon the foreigner for a market for their goods, and upon the white man's store for their supplies.

Railroads now go into Africa from every coast. (Fig. 562.) Steamboats are on most of the navigable rivers and lakes. In many cases, these boats were sent from Europe in pieces, and were thus carried around waterfalls and over plateaus.

725. Interesting animals.—Though Africa has about as many people as North America, and though most of them are farmers (Secs. 734, 751), there is still so

as we study the regions of Africa. This is the way they are arranged:

3. Californian-Mediterranean (Morocco, Algeria).

2. Northeast Trade Wind Desert (Sahara).

1. North Tropic Grasslands (Sudan).

0. Equatorial Forests (Belgian Congo).

1. South Tropic Grasslands (Angola).

2. Southeast Trade Wind Desert (Kalahari).

3. Californian-Mediterranean (Cape Colony).

We shall study about these belts as we study Africa.

QUESTIONS

1. Why is Africa called the Dark Continent? 2. Suppose Africa could be cut in two at the equator, and the southern part pushed 25 degrees south. What differences would be made in the industries and civilizations of this southern part? 3. And suppose the northern part could be placed out in the Pacific Ocean between the United States and China. What would you expect to find there in fifty years? 4. Name all the countries that have colonies in Africa. Which have been forced to give up their possessions? Why? 5. Why were some of the battles of the World War fought on African soil?

6. Why do you think the Abyssinians have remained independent? (Sec. 505, Fig. 445.) 7. What names do we connect with the first knowledge of the interior of Africa? Find evidence of them on the map.

8. By what factor are the seasons determined in Africa? in the United States? 9. Can you find out why the grasslands have one rainy season, but the



Courtesy H. L. Shantz, U. S. Dept. Agr.

Fig. 535. Dar-es-Salaam on the Indian Ocean, with its grass huts and towering coconut palms. It is typical of villages on many tropic shores.



Fig. 535. African carriers or porters resting beside a path in a forest opening. The bales of goods are wrapped in banana leaves.

forest belt two rainy and two dry seasons? (Secs. 747, 748.) What effect do you think the Gulf of Guinea has upon the climate of the land north of it? 10. If you had ten thousand acres of land on the shore of the Gulf of Guinea, what would you do with it? 11. Fill in the blanks below:

TOPIC.	TRIP FROM MOUTH TO SOURCE OF THE KONGO.	TRIP FROM MOUTH TO SOURCE OF THE NILE.
Unhealthy coast....		
Climate.....		
Mountains.....		
Desert:		
Arabs.....		
Jungle:		
Wild beasts.....		
Poisonous insects.		
Tropical fevers...		
Food.....		
Shelter.....		

Which trip would you prefer to take? 12. Can you name some early civilizations in Africa? Why did not civilization extend to embrace the whole of the continent, as it did in Europe?

THE TROPIC FOREST REGIONS
PART I.—THE KONGO AND GUINEA COAST FOREST

727. Location and climate.—Persons sailing along the west coast of Africa from Senegal to Angola will see three thousand miles of ocean waves breaking on the white, sandy beach that lies stretched at the foot of a dark green forest. The forest extends from the coast eastward to the Central African plateau, near Lake Tanganyika and Lake Albert. (A1, Fig. 445.)

Twice each year, once in the fall and once

in the spring, the Kongo Forest has a rainy season. (Fig. 534.) Two short, drier seasons come in between. Each afternoon during the rainy season thick clouds arise, followed by lightning, crashing thunder, and beating rain. The tangled jungle drips; the earth is soaking wet; water often lies in pools underneath the trees; the rivers rise in flood. (Sec. 748.) There is so little wind that the place is called the Zone of Calms or Doldrums.

On land and sea the climate is hot with a damp, muggy heat—a breezeless, stifling heat.

728. The dark forest.—So much rain makes plenty of moisture for the forest. The foliage of the trees is so thick that the forest is dark and gloomy. The branches of the trees are often tied together with the tangling vines of the jungle. Chattering monkeys run up and down this tangle, and serpents climb the trees and crawl from branch to branch. If a traveler in this forest is skilful enough, he may see the terrible man-like gorilla, or the even more man-



Fig. 537. African boys spinning cotton by hand. The spinners loop the twisted thread over the end of the stick. Then they spin the stick like a top and that twists the thread. They regulate the size of the thread by pulling more or less of the cotton out of the mass.

like chimpanzee. With the forest people the word "arrive" is "to come out of the forest"; their word for "depart" is "to go into the forest". If a village is abandoned, vines soon climb over the huts and the forest quickly swallows up the little clearing. Man must fight this great forest for his very life. Is it any wonder that so few white men have gone to this country, and that the few who have gone have lived only a few years? Only the native negro, who has been there for ages, seems able to endure the climate.

729. Pests.—The heat and the moisture make a climate where man has less help and more trouble from animals than in any other part of the world. The heavy rains make ponds and swamps in which mosquitoes breed in countless millions. But mosquitoes do not buzz and bite alone. They are accompanied by biting gnats and flies, and by stinging insects that burrow themselves into one's flesh until it smarts like fire. One of these little pests may burrow under a toenail and perhaps make such a bad sore that the nail comes off. The worst of all the insect pests is the tsetse fly. Its bite carries to men and animals the disease called sleeping sickness. Sometimes almost all the people in certain districts die of this dreadful disease, which also kills cattle, horses, mules, and sheep, leaving much of the forest region without any beasts of burden whatever. Therefore, not having tamed the elephant which lives in this forest, man must become his own burden bearer (Fig. 533).

730. The carriers.—There are no roads here, but only little paths through the forest, and along these paths move the human freight trains of the jungle. Lines of sweating



Photo. Wm. Thompson

Fig. 538. The end of the elephant hunt beside a water course in the Kongo forest. Is this the rainy season or the dry season?

black men and boys, walking barefooted and almost naked, but singing as they go, follow the forest paths. On his head each carries a bundle of freight weighing fifty or sixty pounds.

The train of carriers, creeping along the forest paths as ants creep through the grass, comes at last to a clearing, where the sun glares down on a village of grass houses. The village is surrounded by a stockade, or strong fence of logs. Black men are on guard at the gate to keep out possible enemies.

731. Village life in the equatorial forest.—The village is beside the deep, still-flowing Kongo, where the hippopotamus bellows in the night. By day the flat-bottomed river steamboat chugs along nature's great, winding water road beside the overhanging forest.

The forest path ends at the riverbank, and there the carriers put their bales of rubber, palm kernels, and ivory into the corrugated-iron warehouse of a Belgian merchant. Soon the goods will be taken down to the sea by river boats, and trains that go around the falls. The carriers return along the forest path to their distant village home. This time their burden is cotton cloth, knives, and



Courtesy "Travel Magazine"

Fig. 539. A native with a climbing rope walking up the oil palm. See the clusters of fruit.

copper wire, also bright colored glass beads for the women and children. These things have come up the Kongo by boat and train. From what port?

732. The jungle school.—The jungle people have neither books nor schools, but the children study living things and learn from the parents. The jungle boy knows the animals and trees of his forest better than the average American boy knows anything, except possibly baseball. Jungle fathers teach the boys how to hunt and fish, and how to make all the things they need. The mothers and grandmothers teach the girls how to make a garden, to cook, and to take care of the children. The jungle people have long known how to make iron, to tan leather, to spin, and to weave a little cloth.

733. Jungle food.—What do these black people eat? They have the same nourishment that we have, but they get it from

food that is different. They eat cake made from cornmeal or cassava meal (Fig. 551), palm oil, smoked flesh of game, bananas, and vegetables, such as tomatoes and cucumbers.

734. The forest garden.—The natives are farmers and also hunters. On a piece of well-chosen land, down a forest path, is the village garden. Every two or three years the people make a new clearing to get new soil. When all the good garden sites have been used, they move the village. When the natives want to make a new garden, they chop down the trees with the machete, and at the end of the dry season they burn all the trees they can. They use the ashes as fertilizer for corn, beans, peanuts, cucumbers, tomatoes, bananas, the yam (a kind of sweet potato), and the manioc or cassava (Figs. 551, 553). The up-springing bushes must be kept chopped down or they will overwhelm the crops. Villagers usually take turns watching the garden by night and day to keep the elephants and wild hogs away. The elephant is a terror to the African farmer because it will go ten or twenty miles in a night to eat up a garden. These people do not use beasts of burden as helpers in farming. Their crops are grown by hand labor. Their only tools are simple hoes, knives, and axes.

735. Jungle camping parties.—Sometimes the natives make camps in the forest and hunt. One way to hunt is to make a pit which is carefully covered with leaves. A fence is then built, so that animals wandering through the forest follow the fence, walk over the pits and fall in. After the men kill the game and cut it up (at which they are very expert),



Fig. 540. The January heat equator and rains in Southern Tropic Grasslands. Compare with Fig. 541. Does the physical map (Fig. 566) tell why there is a dry area in the interior of Brazil?

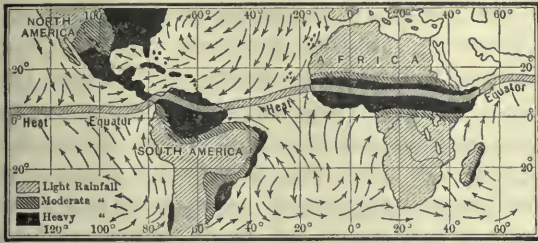


Fig. 541. The July heat equator and rains in the Northern Tropic Grasslands. Compare with Fig. 540.

the women smoke the meat, which they take back to the village. It serves as flavoring for dishes of corn-meal mush.

These people are very fond of fishing. In the dry season, when the streams are low, they go out and camp by distant streams to fish for a week or two.

736. The oil palm.—A palm tree that yields three grades of oil grows throughout the length of the coast forests and far into the interior. In some places there are forests where these trees are only five or six yards apart.

For ages, the natives have used palm oil. When the white man began to buy it, he merely encouraged an old industry. The native oil-gatherer walks up the tree with the aid of a rope (Fig. 539). With his machete he cuts off the bunches of fruit which grow at the top of the tree. Each bunch weighs twenty or thirty pounds, and a good tree should yield one hundred pounds of fruit. The fruit, which is red in color, and yields about fifty or sixty per cent of oil, is carried on the heads of all the family back to the "factory" of the native. The factory consists of an iron pot and a section of a log hollowed out to a depth of two or three feet. The members of the family pick the fruits from the bunch and put them into the pot to boil. A small part of the oil rises to the surface. This oil which first comes out is good to eat. Much oil still remains in the pulp of the fruit, and can only be obtained after the fruit has been put into the hollow log, beaten to a pulp with sticks, and again boiled. The oil from the boiled pulp is soap oil. It is skimmed off and put into big casks holding twelve hundred pounds. To get the

casks of oil to market the natives roll them along the forest trail to a boat landing or to a railroad. Have you seen advertisements of soap made of palm and olive oil?

When the oil has been extracted from the fruit, the seeds are laid out in the sun to dry. When the kernels rattle inside the hard shell, the women crack the seeds between two stones and pick out the kernels. Palm kernels are an important export from the forest region. It takes about a million kernels to weigh a ton. In one year Africa sent three hundred thousand tons of palm kernels to England. This means that African women and girls do a great deal of work with very poor tools.

When crushed in European mills the kernels yield an oil used for margarine (Sec. 442), and a meal or cake that is used for cattle feed, very much as cottonseed meal or wheat bran is used.

737. A land of future trade.—The West African coast between the northern desert, Sahara, and the southern desert, Kalahari, is divided into twenty colonies or states. Nineteen of them are ruled by Europeans; one, Liberia, is under the protection of the United States, because it was set apart in 1847 as a place to which negro slaves, freed in the United States, might go.

The twenty African states of this coast



Courtesy "Travel Magazine"

Fig. 542. Two African hunters and the spears of the victor. Do the Africans make their own weapons?



Courtesy H. L. Shantz, U. S. Dept. Agr.

Fig. 543. Native Grassland huts and garden with tobacco, castor oil, dasheen (elephant's ears), banana and other food plants, all grown by hand labor.

have forty seaports. In the year 1919 their total trade was more than \$40,000,000. This is a more valuable trade than the United States had in its early years. The cocoa industry of the little forested colony called the Gold Coast, gives us an idea of what the future trade of the African forest region may become. A few years ago one of the English governors of the Gold Coast planted a few cocoa trees. The trees grew, and before long a hundred pounds of beans were exported. More trees were planted, and to-day the export of cocoa beans amounts to one hundred thousand tons a year. The country is especially well suited to the cocoa tree, which needs the windless climate of the Zone of Calms, so that the big fruits will not be blown to the ground before they are ripe. The growing of cocoa is very simple. It suits the native. He merely cuts the bushes away from the young cocoa trees that are already growing there, and keeps the jungle down with the machete. No other work is needed until the fruit is ready to pick.

738. Changes in trade.—Since the white man's ships have been going to Africa, one new industry after another has come there—come even to the equatorial forest. First, the white men wanted ivory, for which the natives had but little use. Then he wanted rubber. So the black men first hunted elephants, and then they hunted rubber trees. The white man now wants palm oil and palm kernels and cocoa, besides ivory and rubber.

739. The new transportation.—English engineers and native workmen have built a railroad inland from Akkra, the port of the Gold Coast. They are also building many wagon roads, over which they run motor trucks. A truck with a capacity of one ton carries as many cocoa beans as do thirty-six native carriers. The truck makes several trips while the carrier is making one. Thus we see how the white man's machines can increase African production.

The steamboats of the Kongo now give a good freight service to the heart of the African forest. In the western part of the forest region, the Niger, the Senegal, and the connecting railroads are the arteries of trade.

740. Cleaning up in jungle land.—The white man, often assisted by black policemen, helps to keep order. The tribes now rarely kill each other in war, or sell each other as slaves, or eat each other, as they used to do. Swamps are being drained; physicians are improving conditions of health. We may, therefore, expect the population of the African forest region to increase perhaps as rapidly as that of Java or of the United States has increased. In the decades to come these people may produce and send to us in trade enormous amounts of cocoa, palm oil, banana meal, peanuts, tapioca, rubber, and other products of their little farms. If the population becomes more dense, and if the people grow accustomed to steady work, they may grow sugar cane and rice, to which the country is well suited.

PART II.—EAST AFRICAN LOWLAND FOREST

741. A rainy trade wind coast.—Like the Guinea coast and the Kongo basin, the east coast of Africa south of the equator is a forest-covered tropic lowland. (A2, Fig. 445.) We saw in the West Indies (Sec. 379) that where the trade wind blows against islands and mountains, it brings rain which supports forests. South of the equator, the southeast trade wind, blowing in from the Indian Ocean, makes the coast of East Africa, all the way down to Natal, wet and forest-covered like the Caribbean shore of Central America, and

like the region along the equator (Fig. 540). This forest extends right up to the equator. North of the equator, the summer monsoon of India (Sec. 688) takes the wind toward Asia. Thus the eastern point of Africa is much drier than it would be if Asia were not so placed as to steal these winds.

Along most of this coast it is but a short distance across the hot lowlands to the plateau. Only in the valleys of the Limpopo and the Zambezi rivers do the low plain and the forest extend far inland.

An officer in the English army says that the East African coast has "a fairly plentiful rainfall, and a temperature which, combined with humidity, contrives to make this area uninhabitable for white folk for long periods at a time, and even people in the best of health should return frequently to a temperate climate, to enable them to withstand the rigors of the tropical life."

PART III.—MADAGASCAR AND ITS NEIGHBORING ISLES

742. Islands with Tropic Lowland forests.—The eastern and northern coasts of Madagascar, and the small islands in the Indian Ocean, including Reunion and Mauritius, have the same rainy climate as other trade wind coasts, and are, therefore, forest-covered.

Madagascar is a valuable possession of the French. As it is twice as large as Colorado, it offers possibilities of rich production. Its wet low plain (A3) has the same great agricultural possibilities as has the Kongo, and, like the Kongo and the East Coast Lowland, it is mostly unused. The small island of Mauritius shows what this land might do. Mauritius is ruled by the British, has many Chinese and Hindu people, and exports many shiploads of sugar each year, because the industrious Hindu and Chinese laborers work on the plantations. The islands of Zanzibar and Pemba, which combined have a thousand square miles of territory, give us a further idea of how this region might be developed. These islands have 200 white people, 10,000 Hindus, 10,000 Arabs, and

180,000 negroes. Many of the negroes have small farms; many Arabs have large plantations. One-twelfth of all the land is in coconuts, and one-twelfth in cloves. Much copra and nearly all of the cloves used in the world are exported from this little British protectorate of Zanzibar, where a British "resident" rules through an Arab sultan.

QUESTIONS

1. Where are Africa's cocoa beans made into cocoa and chocolate? Have some member of the class write to a chocolate factory and ask where their raw material comes from. 2. Compare spinning in this region (Fig. 537) with spinning in Bulgaria (Fig. 412); with spinning in England and the United States (Fig. 217). As a worker, which kind of spinning would you prefer to do? Why? 3. Of what use to us are the exports of this tropical forest? How has the automobile extended our trade with the Gold Coast? Where is palm oil made into soap?

4. Why is the banana important in the Kongo and also in Jamaica? 5. Make a long list of ways in which the palm trees are useful to natives of the hot forests and useful to us. 6. Name the animals from this region that you have seen in a circus, a zoo, or a picture book. 7. Where is the world market for ivory? (Sec. 446.) Why? 8. Plan the three meals for a day possible in this region, making them as much like typical meals in the United States as you can.

9. Give two climatic reasons why this region has not progressed as much as some. 10. If you had to live in this region, what occupation would you prefer to engage in? 11. What would you do to make this region more useful to man? Would prosperity be possible in the United States without a school system? 12. Why does the African boy know the life of his neighborhood better than you do?



Courtesy H. L. Shantz, U. S. Dept. Agr.

Fig. 544. A Greek trader on the shore of Lake Tanganyika with three assistants, and natives, at left, who have brought in hides, cassava flour, beans, oil nuts (palm), and butter wrapped in banana leaves. The woman wears "Americana," a large sheet of bright calico.

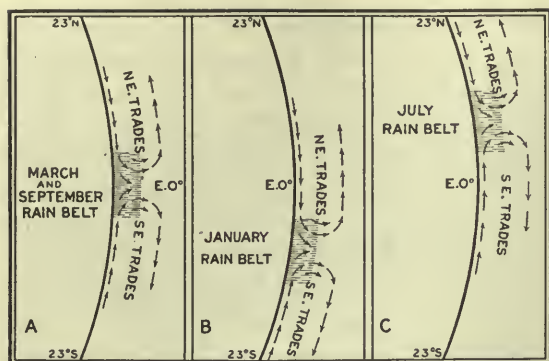


Fig. 545. Curves to represent the surface of the earth between the tropics of Cancer and Capricorn. Three locations of the belt of calms and daily rain are shown. Compare this figure with Figs. 540 and 541.

THE TROPIC GRASSLANDS

PART I.—THE SUDAN

743. Appearance.—A traveler going southward from the Sahara at the end of the rainy season, will find that the sand dunes and thorn bushes become less and less, and that the grass becomes more and more abundant the farther south he goes. (Sec. 568.) Very gradually he has entered a country where there are bunches of grass and scattered mimosa trees. (Fig. 552.) As he rides on, better grass and more trees will appear, and then, after days of journeying by camel and mule, clumps of forest will be seen. Still farther on, he will finally see the solid mass of the equatorial forest. In making the journey, the traveler has crossed the great region of hot grassland that is called the Sudan (Arabic word for black people). It stretches from the Atlantic Ocean to the Nile and the plateau of Abyssinia. It is as broad as the United States, and two-thirds as large. Most of the Sudan is a low plain (less than 1500 feet), but there are some highlands in it.

744. Belts of climate.—Why is it that belts of forest and of grass stretch east and west across Africa? (Fig. 445, B1, B3.) It is because of the unevenness of rainfall, due to the way the winds blow in that part of the world. They move very much as the air moves in a room which has a stove or a lamp in the middle of it. (Fig. 546.) The heat of the stove or the lamp expands the air near to it. The expanded air is lighter than the rest of the

air; it rises as heavier air pushes in from the sides of the room to take its place.

The hot land near the equator acts like a stove. The air above it is heated and then slowly rises. The zone at the equator, at which the air is thus rising, has no wind. For this reason it is called the Zone of Calms, or Doldrums. To take the place of the rising air, air comes in from the north and south. (Fig. 545.) This air, blowing toward the equator, makes what is called a trade wind. (Sec. 364.) The one north of the equator is called the Northeast Trade Wind, and the one south of the equator is called the Southeast Trade Wind.

After the air brought in by the trade winds rises, it goes back northeastward (or southeastward in the southern hemisphere) as a high, upper current (Fig. 547). The only way to study the high currents is by going up in balloons, or by visiting the tops of high mountains, such as the Peak of Teneriffe in the Canary Islands.

745. The Doldrum climate and the forest belt.—When the moist, heated air along the equator rises and is cooled its moisture forms clouds and falls as rain. Every afternoon, for weeks at a time, rain falls. This Zone of Calms, or Doldrums, is one of the meanest

places in the world. It is breezeless, hot, sultry, and very damp. These climatic conditions make that part of Central and West Africa which is near the equator a

great, damp, hot forest. For

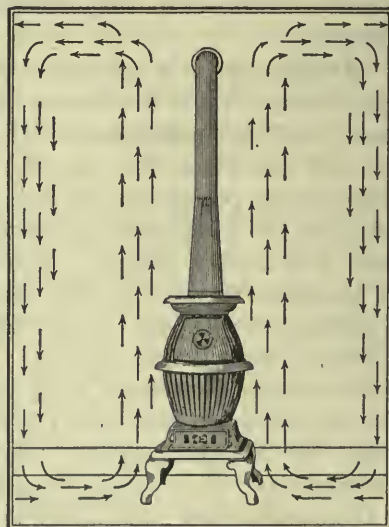


Fig. 546. Try it and see for yourself that the air circulates this way about burning paper, the heated stove or lamp, or outdoor fire.

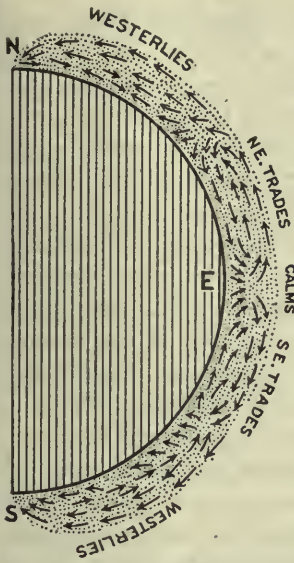


Fig. 547. A cross section of one-half of the earth and its atmosphere. The atmosphere is much exaggerated in height so that the arrows can show the direction of the air on the earth and above it.

the same reasons we find the same kind of a forest near the equator in South America, and in the East Indian Islands.

746. The tropic grassland climate.

—Let us again consider the stove in the room. Now suppose you move it a few feet from the center of the room. What effect will this have on the direction of the air movements in the room? Draw two diagrams on the board or on a piece of paper and see for yourself. The air

will be circulating as it did before the stove was moved; but since the stove has moved, the center of circulation or the zone of rising air will have moved with it, and the air will now be blowing straight across the place where the stove first stood.

Something very much like that happens in Africa. The Zone of Calms, or the Doldrums, follows the sun, just as the calm place in the room followed the stove. (Fig. 545.) In the time of our summer, the sun moves north of the equator and shines straight down, so the center of rising air, or Zone of Doldrums, moves north. Land that before had the trade winds now has the doldrums. Since the doldrum belt is the rain belt the grasslands of the Sudan receive a good soaking at this time.

When our winter season comes, the sun has moved southward, and shines directly down on the land to the *south* of the equator. The heat center, or Zone of Doldrums, then goes south of the equator. At this time the hot trade wind from the Sahara again blows over the northern grasslands and dries them up, but the doldrum belt is making down-

pours of rain on the grasslands south of the equator. The climate of the African grasslands seems to act like a kind of see-saw: while heavy rains are falling south of the equator, everything north of it dries up; up and down, up and down, the seasons shift. The hot tropic grassland regions have but two seasons: rainy, when the sun is overhead (summer); dry, when the sun is on the other side of the equator (winter).

747. The dry season.—When the grasslands are receiving the hot sun and the desert wind, there are months when no rain falls; most of the streams dry up; the ground becomes so hard and dry that it cracks open. The grass is turned into natural hay without being cut. Unless burned, it stands there, making good forage for the animals. At this season water is often hard to find. Travelers sometimes see hundreds of animals standing around a mud hole where they have drunk up the last of a pond of water. (Fig. 557.) If a stretch of grass has been burned, grass-eating animals stand in the burned-over space when they are not feeding. There they are safe from lions that would sneak up through the tall grass, and spring upon them.

748. The rainy season.—In the time of our summer, which is the Sudan summer also, the trade wind from the dry desert stops blowing across the Sudan. Light breezes may blow in any direction. The Zone of Calms has now come, bringing a sultry dampness to the air. The mornings are bright and clear, but the heat fairly bites. Then big white clouds rise, and in the afternoon heavy showers of rain fall, accompanied by much lightning and thunder. Water runs in the dry gullies. Swamps, ponds, and lakes form in the lowlands. Grass grows so fast that it almost seems to jump. Leafless trees put out new leaves, as our trees do in spring. Birds build nests and rear their young.

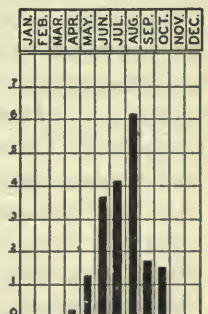


Fig. 548. Tropic Grassland type rainfall of Fort Lamie, Sudan, 22.12 inches. When does the grassland woman plant her garden?



Courtesy "Travel Magazine"

Fig. 549. A dead rhinoceros with its head propped up on a stone. What animal is stronger than the rhinoceros?

This season of rain is shorter near the desert than it is near the forest. Sometimes, near the desert, it lasts only a few weeks in the whole year, leaving many long months of burning sunshine; sometimes only a little rain falls and famine comes. People pray for a long rainy season. On the other hand, in the equatorial forest some tribes pray for a short rainy season.

749. Swamps.—In the rainy season the Nile overflows and large swamps form along the upper Nile and about Lake Chad. Since this lake has no outlet, it rises every rainy season and floods large areas of flat land; then in the dry season it dries up again.

750. Grassland animals.—The broad stretch of the Sudan is the home of grass-eating animals. Here live the antelope, of which there are many kinds, and the giraffe, the rhinoceros, and the ostrich. Here also are the meat-eating animals that prey upon the grass-eating animals. This is the home of the lion and the leopard; of the hyena and the jackal. The elephant, a grass-eater, lives in the more bushy parts of the grasslands. It is not long since elephants were found all the way from the Sudan to the Cape of Good Hope, and lions from the Cape to the Mediterranean.

751. People and agriculture.—The Sudanese are large, strong, black people. They have different ways of making their living in different parts of the region. On the northern or desert side, where the dry season

is long and the rainy season is short, and where the rains are uncertain, the people are nomads, with flocks of camels, sheep, and cows. They raise camels to sell to the caravan traders. The light and irregular rains sometimes cause dreadful famines, which make the hungry people raid and plunder their more prosperous neighbors. These tent-dwellers do not enjoy the rainy season. When it comes they sometimes run away from it and move out into the edge of the desert, where they camp by some stream which is fed by the rains to the south of their camps.

South of the nomad belt, where the rainfall is greater, the people can grow crops of grain. Here the Sudanese are farmers. They live in villages of houses that have mud walls and grass roofs. Close to each village is the hand-cultivated garden. It contains cassava (Sec. 369) and durra, which are the great breadstuffs, and beans, peanuts, pumpkins, and other vegetables. Instead of bread, the native of the grasslands and often, too, the native of the Kongo eats corn-meal mush, and boiled leaves of the cassava. Meat is a luxury which is often used as seasoning for the mush; some natives eat no meat at all. Some natives of central Sudan keep flocks and herds and raise a little cotton for their own use. In this farming country there are many towns. The largest, Kano, on one of the higher sections of British Nigeria, had a hundred thousand people even before white men built the railroad to it.

752. Native rulers.—In this part of the Sudan there have been many small kingdoms, each ruled by a native king. Parts of the Sudan often have been conquered by nomads from the desert. The conquerors would then protect a certain territory from other nomads, and take a part of the grain and flocks as a tax.

753. Foreign rulers.—Most of the Sudan is a part of the great African possessions of England and France. The people of the European countries are becoming more and more interested in their African colonies, and we may expect many changes to take place in the future. (Sec. 723.)

754. A great future trade.—European rule will insure more peace for this region and an increase of population. The Arabs have carried slaves out of the Sudan for so many centuries that one can almost find the way to the Mediterranean coast by following the trail of human bones, where the poor negroes have died by the wayside. One of the chief objects of tribal wars was to take prisoners to sell as slaves. Now that the slave trade has been stopped and Europe sends rulers, there are but few instances of tribal wars.

Will foreign rule increase the population? In 1881, Anglo-Egyptian Sudan had eight and one-half million people. By 1903, wars, famines, and diseases had killed over six millions of them, and the total population was less than two millions. In 1903, the English took charge. They have kept peace and have done what they could to teach the natives better methods of living. In eighteen years the population has about doubled. Northern Nigeria has nine millions of people. The whole Sudan has twenty millions and may soon have fifty or seventy-five millions.

This region of hot African grasslands, more than half as large as the United States, may some day produce quantities of peanuts and beans, much cotton and corn, and many cattle. Its millions of big, strong black



Courtesy H. L. Shantz, U. S. Dept. Agr.

Fig. 550. Because of the danger of famine from drought, the governor of British Uganda makes the natives deposit 100 pounds of grain per person in these native storehouses after every good crop.



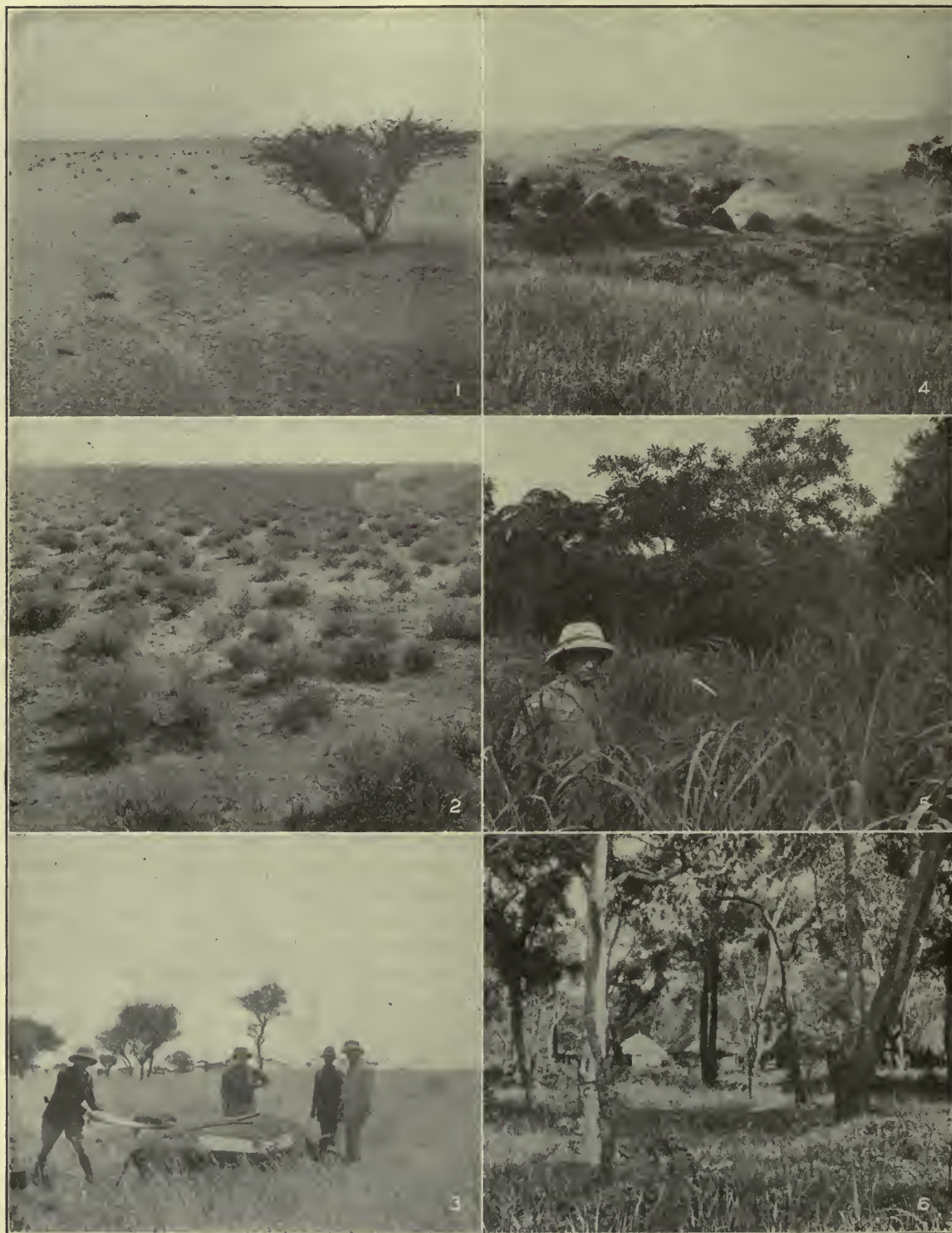
Courtesy H. L. Shantz, U. S. Dept. Agr.

Fig. 551. A native Grassland woman, her home, her garden and her bread-making, near Lake Tanganyika. (A) Cassava growing plant; (B) fresh roots; (C) fermenting roots; (D) drying before pounding; (E) pounding to flour in mortar made of hollowed tree trunk; (F) cassava flour ready to bake.

people are not very fond of work. Who would be ambitious in a country as hot as theirs? But they would like to have something to sell, so that they could buy some of our things.

755. Cotton.—For a long, long time even the most isolated tribes in that region have grown a little cotton, spun it by hand and woven it into cloth. (Fig. 537.) Now comes the European, trying to teach better ways of growing cotton. Much land can be irrigated along the Niger, the Shari, and the Nile. The English are planning large reservoirs for irrigating hundreds of thousands of acres on the plains south of Khartum. Passenger and freight steamboats are regularly running on 2500 miles of the upper Nile River and its branches, between Aswan, 24° N., and Rejaf, 5° N. Some cotton is being shipped each year from the trade center at Kano, Nigeria, to Manchester, England. There seems to be no reason to suppose that the black men in the Sudan may not grow almost as much cotton as their cousins in the cottonfields of our own south.

756. Cattle.—The Sudanese have been cattle-herders for many generations. This being the case, it may be easy to start the export of meat. The government of Anglo-Egyptian Sudan is fighting cattle diseases



Photos courtesy H. L. Shantz, U. S. Dept. Agr.

Fig. 552. The journey from the desert to the forest.

1. Very few scattered bushes.
2. More bushes and sparse grass.
3. Short grass and scattered trees—big-game country.
4. More trees, more grass. Farmers' village of grass huts. Smoke from fire inside one of them.

5. Tall grass and clumps of low forest.
6. Grass house village in open forest.
7. The last of the series is Fig. 553, the equatorial jungle tied together with vines, and the very first is Fig. 443, the bare dead desert producing nothing at all.

there, just as our Department of Agriculture is fighting them in the United States (Sec. 44). The native corn, or durra, of this region is much like our own Kafir corn, which is, in fact, an African plant. Such corn is good for cattle-feed in Oklahoma and Kansas, so why not in Africa? Nor is there any reason why canned meat should not go to the London market from big packing plants at Kano or Khartum, as well as from Omaha, Nebraska, or Forth Worth, Texas. Costs have much to do with such matters. At present, in the interior grasslands of Africa, the tin can costs more than the meat.

Now that this wide belt of grassy lowlands has entered upon the age of engineering, of railroads, of irrigation, of tractors, and of reapers; of scientific agriculture, of dry farming, of new crops, and of the new methods of teaching farming, it will be interesting to see what the white man as teacher and policeman, and the black man as pupil and worker, can succeed in doing there.

PART II.—THE EAST POINT OF AFRICA.

757. A region of poor grass.—The horn of Africa, east of the Abyssinian plateau and of the 40th degree of east longitude, is much like the drier parts of the Sudan. (Fig. 445, B2.) What happens to the summer winds along this coast? (Sec. 741.) The annual rain-



Courtesy H. L. Shantz, U. S. Dept. Agr.

Fig. 553. A Kongo forest garden. The small growth has been removed, and cassava, bananas, and un-irrigated rice grow all together beneath the tall trees.



Courtesy H. L. Shantz, U. S. Dept. Agr.

Fig. 554. A specimen of native African grassland cattle and a grass-roofed barn with mud-plastered walls.

fall is less than twenty inches, and in most of the country there are no streams that flow all the year. This region has a scanty population of big, strong, black people who follow flocks and herds.

What nations claim parts of this region?

PART III.—THE SOUTHERN AND EAST CENTRAL GRASSLAND PLATEAUS.

758. Southern grasslands.—While the Sudan is drying up in January, what happens in the southern grasslands? (Fig. 445, B3. Sec. 746.)

Most of the Sudan is below 2000 feet in elevation. Nearly all of the southern grasslands or savannahs are above 3000 feet in elevation, so that this region is really a plateau. It is a better place for white men than is the Sudan. Like the Sudan, it is covered with grass and scattered trees, but in some of the valleys of the rivers draining this region there are many miles of forest. The natives live as do those of the Sudan.

759. Mineral wealth.—The southern grassland region has a great copper deposit at Katanga. European engineers are in charge of the mines, and native black men are doing

the work. Thousands of tons of ore are being shipped out each year by railroad and steamboat, and Katanga promises to be one of the great copper districts of the world. In the southern part of this district are many gold-bearing rocks; it is said that the mines of King Solomon were there. Many tools and remains in the old workings show that the Arabs dug gold there many centuries ago.

760. The savannahs of East Central Africa—a higher plateau.—East of the 28th degree of east longitude, the plateau, reaching from Lake Nyasa to Abyssinia, is from 4000 to 6000 feet in elevation; nevertheless, it has areas of moist, hot, flat, rich land along the lakes. These rich plains are densely peopled by black natives, who live in villages of grass houses surrounded by well-kept fields of bananas, cassava, sweet potatoes, peanuts, beans, and other vegetables. Most of the upland is grassland.

761. A land of big game and of big men.—These grassy plains are much like the Sudan in appearance. Here Mr. Roosevelt hunted the same kinds of wild animals that live in the Sudan, and here he found the same kind of native farmers.

The greatest difference between the Sudan and the East African grasslands is the elevation. The greater elevation gives East Africa a cooler, better climate, in which the white race perhaps may be able to live and thrive. Indeed, some British farmers have already settled in the region between Lake Nyasa and Abyssinia (Fig. 531), but in the most of the high grasslands the number of black men is many times greater than the number of white men.

Explorers report that part of this grassy plateau is a very fine country of beautiful, rolling land. The native men have splendid physique. Doctor H. L. Shantz, of the United States Department of Agriculture, tells of seeing whole tribes whose men were all over six feet tall, and some were over seven feet. One tribe has a rule that a young man cannot marry until he has gone out alone, armed only with shield and spear, and killed a lion. Dr. Shantz saw these big black fellows in their sports. Some of them ran and jumped over the backs of four or five cows that stood side by side. They jumped over a string held eight feet above the ground. The only help they had was an ant hill, six or eight inches high, from which they jumped off. Can anyone in your school jump to a height of eight feet?

In this part of Africa there are snowlands close to the equator. The peaks of Kilimanjaro and Ruwenzori rise nearly three miles above this plateau, to the height of perpetual snow.

762. A distant meat supply for Europe.—For the future, as at present, the chief product, other than minerals, from these eastern and southern grasslands, will be animal products. In the interior of Rhodesia, one thousand miles from the sea, English companies are building miles of wire fence, and are making dipping vats for cattle (Fig. 594.) Packing houses for the manufacture of beef extract and canned meat have also been built.

Nearly all of this region is under the control of England, and will, therefore, probably have peace and order. Europeans have gone there to direct the natives as they begin to carry on industries, as the



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Fig. 555. A baby orang-outang clinging to the native hunter who has caught him. The baby is covered with red hair.

white man does. The trade of this country will be much like that of our own Great Plains.

PART IV.—THE ABYSSINIAN PLATEAU, AFRICA'S HIGHEST COUNTRY.

763. A land with vigorous climate.—Most of Abyssinia is a plateau more than eight thousand feet in elevation. The inhabitants of the high plateaus do not descend below 3200 feet during the rainy season, because the depths of the valleys are so unhealthful and the plateau is so healthful.

Like the Sudan, it is grassland because it has a dry season and a season of summer rain. This plateau furnishes most of the water and rich volcanic mud with which the Nile Valley is flooded and made fertile. (Sec. 587.) It has a rich, volcanic soil, and much level upland, in which the rivers have cut deep valleys and sometimes even canyons.

764. A vigorous people.—Because of the cool climate of the plateau, the eight million people of Abyssinia are the most vigorous natives of Africa. In all Africa, Abyssinia is the only country not claimed or protected by some nation which lives in the land of frost. Italy tried to conquer Abyssinia in 1896, but the invaders were driven out and the country remains independent, with an empress as ruler. Europeans have started European schools, but they only have 100 pupils, and they do not study much.

For fifteen hundred years the Abyssinians have been called Christians, and have belonged to the Church of Alexandria, just as many people in Europe and America belong to the Church of Rome, or to the Greek Church. The Church of Alexandria was founded in Roman times.

The Queen of Sheba, mentioned in the Bible, is supposed to have come from Abyssinia.

765. Abyssinian industries and trade.—These people make flour from their own wheat, barley, and durra. They weave cloth of cotton and wool, and make leather and soap, but they have none of these things for export. The Abyssinians buy cotton cloth, hardware, sugar, and kerosene from



Courtesy H. L. Shantz, U. S. Dept. Agr.
Fig. 556. Native boys in the market square of a Grassland village. What articles are in the market?

white men, and pay for them with hides and skins. There are large forests of wild coffee trees from which some coffee is gathered, but only a little is exported. There are large herds of cattle, sheep, goats, donkeys, mules, and horses. No one knows how long these people have been tending livestock. They are beginning to export animals by way of the five hundred miles of French railroad from Jibuti on the Red Sea to Addis Abeba, the capital of Abyssinia. This city has an elevation of 6000 feet and a population of 40,000. How would you compare the climate of Abyssinia with that of Mexico?

PART V.—THE MADAGASCAR GRASSLANDS.

766. The island of Madagascar is in the latitude of the southeast trade wind. This location gives it a wet, forest-clad coast on the windward side of the mountains, and grasslands in the interior and on the southwest coast, where the trade winds do not blow. Much of the interior (Fig. 445, B6) is a grass-covered plateau, like that of Rhodesia. The southwest coast (Fig. 445, B5) is lower and hotter.

Compare Madagascar in size and population with Texas. The island is a French possession, and its low grasslands and high grasslands are like the other tropic African grasslands of similar elevations in climate, in appearance, and in the way in which people live. (Secs. 758, 762.) Tananarivo, the capital, and several other towns in Madagascar already have meat-packing plants.

QUESTIONS

1. Which is the larger, the African grasslands or the African desert? 2. What are some of the dangers of travel in the Sudan? Who supports the family in the Sudan? 3. What parts of Africa may be made to supply European mills with raw cotton? Discuss, under the following heads, the advantages of this region for raising cotton:

CLIMATE.	TEMPERATURE.	MOISTURE.	TRANSPORTATION FACILITIES.	LABORERS.

4. How would canned goods be carried from Khartum to London? from Kano to Bergen? 5. Why do we consider such scattered parts of Africa as one region? 6. In order to marry, what things does a man in the United States prove himself capable of doing that might be compared with the task of the lion hunters of East Central Africa? 7. Describe the journey of a bundle of hides from Abyssinia to Philadelphia. What may these hides pay for? Could Abyssinia buy goods from other countries if she did not sell goods? Could she sell goods without buying something in return?

8. What great lake of the East African Savannah is crossed by the equator? Is it hotter there or at a place north of Kano? Why? Is it possible to have snow at the equator? Explain. 9. How is Abyssinia the gift-giver of the cotton which England buys in Egypt? 10. How is the Grassland climate a hindrance to progress? 11. Compare this great plain of the Sudan with the great plains of North America from the fol-



Courtesy H. L. Shantz, U. S. Dept Agr.
Fig. 557. An African river in the dry season. The sand is tracked by animals that have come to drink.

lowing standpoints: extent east and west compared with extent north and south; crops; homes; animals; distribution of rain throughout the year. 12. Compare difficulties in the journey of the gold which was sent to Jerusalem for Solomon's temple with those which a similar shipment would meet to-day. Can things be sent to-day that were not sent in Solomon's time?

13. What is a canyon? Why are there so many more in Abyssinia than elsewhere in Africa? Where else in Africa would you expect to find some canyons? 14. Are the monsoons of India an advantage to the east point of Africa? Give reasons. 15. Why has Lake Chad no outlet, while Lake Victoria has? 16. Why is it dry in the Sudan when the trade winds are blowing? 17. What people of the United States would be best fitted by their occupation to live in the grasslands of Africa? Which of Madagascar's grasslands will suit white men best?

THE WHITE MAN'S SOUTH AFRICA

767. Location.—That part of South Africa in which white men can live and be healthy we call "The White Man's South Africa." This region is bounded on the northeast by the hot lowlands of the Limpopo Valley, and on the northwest by the dry lands of the Kalahari Region. Most of the region is a high plateau with very narrow low plains along the seashores.

768. Another California.—The western tip of South Africa, called the Cape Section, is in latitude similar to that of southern California, and it has the climate and therefore the crops of that region. It so happens that western coasts of continents in that latitude always have that kind of climate. We found it in Spain and in Italy. We shall find other such coasts in South America and Australia. This is the climate of the winter rains, and of the dry summer when fields are brown and bare and roads are dusty.

While the Cape Section is another Californian-Mediterranean region, it is a very small one and the water supply is poor. The mountain ranges have little snow and are parallel to the southern coast, and, therefore, they catch very little rain from the west wind. All of the few streams are used for irrigation. There are some very valuable orchards of peaches, plums, oranges, and other fruits. The grapes are especially fine. The fruit can be sent to the markets of Europe and the United States when it is winter in the north-

ern hemisphere, but the freight makes it very costly. How would South Africa be helped if its mountains were like the Sierra Nevada in direction and height?

769. Another Florida.—

We have found that the west coasts of continents just outside of the tropics are like California. The climates of eastern coasts of continents in the same latitude are also much alike. They all have moist summers. Thus the coast of South Africa, called the Natal Coast, has the moist summer climate which we have already seen on the southeast coasts of Georgia, Florida, and South China. (Sec. 668.) We shall find this climate again in the same latitudes in South America and Australia. (Secs. 804, 882.) These sections have more rain in summer than in winter, so that forests cover the land, and corn, sugar cane, cotton, oranges, and even bananas can grow there.

The South African Florida, like the South African California, is small. The hot, damp plain by the sea is narrow. A series of terraces or step-like plateaus reaches upward one after the other toward the high Drakensberg Mountains. On the low plain, sugar cane, bananas, and oranges are grown for the South African market. A little tea is raised with the help of workers from India. The summer rainfall helps corn, which is the chief crop, to grow on several of the plateau steps. The good pastures on the cool upper slopes of these mountains support a dairy industry; but this cool dairy section, like the coast plain, is small in area.

770. Another New Mexico.—West of the crest of the Drakensberg Mountains is a wide plateau, sloping gently away across the Orange Free State and the Transvaal, toward

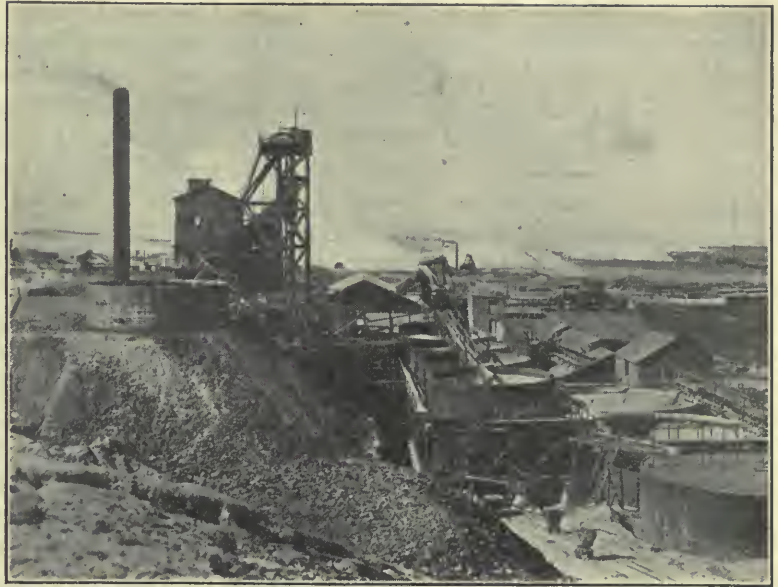


Photo. Brown Bros., N. Y.

Fig. 558. Equipment for handling ore, and vats for soaking the gold out by the cyanide process. This process enables men to make profitable use of ore that contains very little gold.

the Kalahari Desert Region and the Atlantic Ocean. The mountains shut most of the moist winds away from these plains, causing a dry interior climate, such as we found in New Mexico (Sec. 143) and the edges of the Sahara (Sec. 576), and that we shall find again in South America and in Australia.

At the inner edge of the mountains the rainfall is thirty inches per year. Some corn can be grown there, and the plain, or "veldt," as the Dutch call it, is covered with fine grass. As we go away from the mountains and descend the slope of the veldt, the rainfall becomes less, farming becomes impossible and the pasture poorer, as is the case when one goes southward from the Rocky Mountains into New Mexico. Here, as in our southwestern plateaus, are ranches, with millions of cattle, sheep, and the long-haired goats that yield mohair. The chief exports of South Africa, except gold and diamonds, are skins, wool, and mohair.

771. People and government.—This region was well settled by cattle-keeping, grain-growing blacks when the first white settlers came. Even yet there are four blacks to one white person. Cape Town and the

Fig. 559. Gold production—five leading nations (1913):

	Million dollars
A. South Africa.....	207
B. United States, including Alaska	88
C. Australasia.....	53
D. Russia, Finland, and Siberia	26
E. Mexico.....	19

region near the tip end of South Africa have many British people, but the Dutch were the first white settlers. A great many of the white people of the interior are Dutch and are called Boers, a Dutch word that means farmer.

In 1910, the four British colonies of Cape of Good Hope, Natal, Orange Free State, and Transvaal formed the Union of South Africa, very much as the Canadian colonies formed the Dominion of Canada. It is really a kind of United States of South Africa, with its capital at Cape Town.

772. Another Abyssinia.—The highest part of the South African plateau is a high, rugged region about the size of Maryland and is called Basutoland. This is the best part of South Africa for grass-growing and for grain. Its four hundred thousand black people are almost independent; they are farmers, and raise sheep, cattle, corn, Kafir corn, and wheat.

In 1883, the Basuto army defeated a British army, and, though victorious, they had the surprising wisdom to sue for peace at once. They permitted the British to have the appearance of victory by accepting a British commissioner as their governor, who serves as a kind of governor-general to the Basuto chiefs. They kept for themselves the real fruit of victory—that of getting the white men to agree not to settle in their country. The only white people there are connected with the government, or are traders or missionaries. When the first British governor came to take charge, the Basutos met him at their boundary and escorted him to the capital with a guard of ten thousand armed men, each mounted on a good horse.

773. Gold and diamonds.—In 1867 a settler's wife near the Vaal River was dressing a chicken one day and found a diamond in the

chicken's crop. This is said to have been the incident that led to the discovery of great beds of clay containing diamonds. Then arose Kimberley, a city now having 50,000 people, and from the mines near the city come 98% of all the diamonds in the world, \$60,000,000 worth each year. The Kimberley diamond companies have united into a trust that sets the price, and decides how many diamonds shall be sold.

At Johannesburg in the Transvaal is the greatest gold-mining region in the world. Long ridges of sandstone rocks have enough gold in them to make it pay to dig mines a mile deep. Johannesburg was founded in 1886, and had 100,000 people ten years later. It has grown faster than Winnipeg, Manitoba, and is now the largest city of South Africa. Mining is by far the most important industry in South Africa.

The gold and diamond mines are owned by the English; some of the engineers who plan the work are Americans; but nearly all the work is done by natives who come down from the hotter parts of Africa to work for a time in the mines, and who then go back, each with a bag of money.

774. Trade.—Most of the trade of South Africa is with Great Britain, Holland, and the United States. Gold and diamonds stand far above all other exports. Next come wool, mohair, skins from the ranches, meat from the packing plants, and ostrich feathers from the farms where ostriches are kept to supply these ornamental plumes. Since the ostrich cannot fly, it can be kept in a field surrounded by a wire fence, where it may be fed grass and grain. (Fig. 530.)

This is a new country, like West Canada, but it does not export much grain because only a small part of the country has rainfall enough to make it a good grain country. South Africa imports clothes, machinery, and sometimes wheat.

775. Future.—South Africa will be prosperous as long as the mines of gold and diamonds hold out. After that, its prosperity can be continued by scientific agriculture. Irrigation is needed, but the necessary water

is hard to find. Terrible droughts sometimes starve the sheep and cattle on the veldt. The future prosperity of South Africa lies in some kind of dry farming. Perhaps the crop will be olives (Sec. 556). Wild olive trees grow over most of its area, inviting man to make of them a crop.

QUESTIONS

1. List the things you would need to find in looking for a good place in which to live. How many of them would you find in South Africa? 2. Compare the industries of Natal with those of Florida. Is there any other place with which we might compare parts of Natal? 3. Is it fair to say that South Africa has a California? 4. Give some evidences of Dutch occupancy in the names of cities of this region; evidences of English occupancy. 5. What cargo might a ship sailing from Durban or Cape Town carry? Trace each product to the part of the region from which it comes. 6. Why are not diamonds sent directly to New York? (Sec. 449.) Tell just how the diamond would travel and where it would stop on the way to a jewelry store in Salt Lake City, Utah.

7. Name the uses to which mohair may be put. Where in the United States is it obtained? Trace some of the exported mohair of this region to the end of its journey as a manufactured product in America. 8. Arrange the products of this region in the following classes: for home use only; largely for export; for home use and export. 9. Why is there no city at the mouth of the Orange River for shipping gold? 10. Which is more valuable to England, her coal mines in Great Britain, or her other mines in South Africa?

11. Compare the density of population of this region with the population of the Sudan. Why the difference? In population, which will grow the more? Why? 12. Describe trade between Basutoland and Natal. 13. What industry of South Africa is not carried on to any large extent on any other continent? 14. How has the life of the black man in South Africa been changed by the coming of the white man? 15. Has the black man been helped?

THE KALAHARI DESERT AND ITS EDGES.

776. A dry region lies west and north of the White Man's South Africa and south of the high Tropic Grasslands (Fig. 445, C2). It

stretches along the west coast to about latitude 11° . For a thousand miles no permanent stream enters the sea. The trade wind blowing over the land helps, as in the Sahara, to make it dry and hot, but the desert part is very much smaller than the Great Desert. Like the Sahara, it has a river crossing it from the lands of greater rain, but, unlike the Nile, the Orange River has but little water. The Kalahari Desert is not so dry as the Sahara. Most of it has something that animals can eat at some season. There are wide stretches of scattered bushes, and also salt plains that are covered with water at times of occasional rain. The greatest difficulty in using this land is the absence of drinking water for months at a time.

777. The native life.—Several tribes of black people live in this country. Most of them are nomadic followers of flocks. Unlike the Arabs of the north, they have no camels—only goats, cattle, and fat-tailed sheep. One of the tribes, the Bushmen, keeps no animals at all, but hunts game at water holes. The Bushmen are ignorant people,



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Fig. 560. Myriads of gannets resting on a dry rocky islet off the Kalahari Desert coast. Such colonies of sea birds have also left valuable fertilizer deposits (guano) on the Chincha Islands, just off the coast of Peru.

and small in size. They kill their enemies with poisoned arrows.

778. The coming of the white man.—In the edges of the desert, where the rainfall is between ten and fifteen inches a year, there are stretches where, at the end of the rainy season, the ground is almost covered with a wild melon somewhat like the cantaloup. During this season the white men sometimes drive across the country in ox carts. If they cannot find streams it makes no difference, because the melons furnish water for both men and beasts. In this region the white men are building water tanks and digging wells. By these means they secure a supply of water, and cattle ranches thus become possible.

At best the agriculture of this region can be like that of Arizona or western Texas, chiefly ranches where much land is necessary to support a single ox, sheep, or goat. Irrigation can only be used in small, scattered patches where a little water can be found at an artesian well or a mountain stream. Perhaps the better parts of Kalahari may support the same kind of dry farming that may be carried on in our own Southwestern Plateaus. (Sec. 147.)

Because there are large deposits of iron ore, copper, and gold, desert mining towns



Fig. 562. A transportation map of Africa. Remember that the Sahara is as large as the United States.

like those of Nevada are beginning to appear. There may be many such towns in the future.

QUESTIONS

1. Even though the continent were as wide here as in the north, the Kalahari Desert would not be as wide as the Sahara. Why? 2. Compare the sources, length, direction of flow and usefulness of the Nile and the Orange rivers. 3. What are the exports from

this region? 4. Compare in appearance, mode of travel, and manner of defense, the tribes of this region with the nomads of the Sahara; of the Russian Steppes; of the Sudan.

5. In what other place besides in Africa could the picture, "African ostriches on their feeding ground" (Fig. 530), have been taken? 6. On what interests is the Union of South Africa based? What other countries in Africa could form a union based on common interests?

7. What is the only thing likely to increase the white population of the Kalahari region? What does the history of Leadville, Colorado (Sec. 119), tell us about the future of some South African towns? 8. Would the discovery of mineral wealth cause a great seaport to rise at the western edge of the desert?



Courtesy R. G. Dun & Co., N. Y.

Fig. 561. Ships exchanging cargoes at the Canary Islands, a port of call for many ships in the African trade. Why should the leeward side of these islands have treeless mountains?

THE TRADE OF AFRICA SOUTH OF THE SAHARA

779. The steamships.—As the coasts of Africa are smooth and straight, with few bays, gulfs, or harbors, it is harder to open trade routes into Africa than into Europe or North America. (Sec. 721.) It is easy for ships to skirt the coast of Africa because there are so few capes, small islands, sand bars, or fogs. Lines of steamers from Liverpool, London, Antwerp, and Marseille carry the goods of Europe and America down the west coast and down the east coast. Some steamers go entirely around the continent.

Now the hardest problem of the ships is to get in touch with the people of the continent, because the steamers must anchor beyond the surf, and put their freight off into small boats. The obstacles within the continent that kept men out of Africa (Sec. 721) are now being conquered. Railroads have been built to carry freight around the cataracts of the Nile, the Kongo, and the Niger, to the steamboats on the level reaches above. There are also steamboats on the great African lakes.

780. Cape to Cairo railroad.—The English have been working many years on the big plan for a railroad from Cairo to Cape Town. The map (Fig. 562) shows that most of the road is built. It will not be long before one can go the whole length of Africa by train, or by trains and boats on lakes and rivers. Travel on such a route will be slow, hot, and costly, and there will be few through travelers and but little, if any, through freight. The British, however, will be glad to tie together by this railroad their far-extended African territory. The map shows many side lines



Photo. Brown Bros., N. Y.

Fig. 563. This is the way the white man gets railroads built through the African forest. Many valuable timbers are used for railroad ties.

that have already been built, in whole or in part, from the east coast inland to join this route. The frame-work of an African railway system is already made. Many branch lines are being built and more are needed in this land of enormous distances and poor transportation.

781. Airplanes.—It may not be long before the airplane will soar over desert, savannah, forest, river, and lake, and carry passengers and mail from London to Cairo and Cape Town. It has already been used in wars against the natives.

782. The exports.—The first thing in African trade is to wake the native up and make him willing to work for the things which he is in the habit of going without. Africa has many resources. What will she send to the world? First will be the valuable minerals about which we have already studied. Even the mines of Katanga, far in the heart of Africa (Sec. 759), are already sending several shiploads of pre-



Fig. 564. A native market in the town of Ujiji, where Stanley found Livingstone. The pet baboon, who is regarded as something of a nuisance, has just stolen a small dried fish from one of the vendors.

cious copper each year to the factories in other lands.

Next in importance are the easy-yielding tree crops: palm oil, coconuts, cacao, and rubber (if the East Indies do not supply all that we need). It is natural for the people to extend these home industries and to begin raising these valuable products instead of gathering them wild from the forest.

Third in value are the products of the pastured plain: hides, wool, and meat.

Last, as the tribesman settles down, will come the products of the more laboriously cultivated annual crops, of which a great start has already been made in peanuts, and a very small start in cotton. Many of these crops are old to Africa, but the native who in the past, with the aid of a hoe or a sharp stick, grew enough to eat in his or her (especially her) little patch of garden, will have to learn new ways of farming before grain can be exported. The white man is teaching these new ways, and also helping to find a market for the product.

783. The imports.—The money that these exports bring to Africa will be spent in buying white men’s manufactures, such as needles and pins, pocket knives, and even locomotives. The African likes to spend

money, to dress up in good clothes, to listen to music, and to ride in automobiles.

The trade, once established, will be permanent. The Africans want our things. And is there a reader of this book who does not want African chocolate, or soap made of African palm oil?

784. Future.—Africa, with her hot climate, will continue to produce raw materials to exchange for our manufactures. The production will be largely under charge of the energetic white man; but the black man will prosper through helping to produce the raw materials. The prosperity of the black man in the African forests or grass plains helps to make the white man’s prosperity in lands where snow flies and blizzards rage.

QUESTIONS.

1. Why is there but little attempt to use the falls of the rivers of Africa to manufacture power? If you could use the water of Victoria Falls to run a factory, and had the people to work on it, what kind of a factory would you open? Why? 2. How has the coming of the white man to Africa changed the life of the black man of the forest? the men of the grassland? 3. Show by the map two or three routes by which railroads and steamboats make it possible for a traveler to ride nearly all the way across Africa from east to west. Show two routes by which you might buy tickets to Timbuctu. 4. Would England like to get raw cotton or cotton cloth from Africa? Why? Will Africa in the future export manufactured or raw material? How many things are in your neighborhood that may have come from Africa?

5. Write these five African exports and six others in the product column: gold, cotton, dates, ivory, ostrich feathers. Tell the region in which each is found, the country, and the European nation controlling it.

PRODUCT.	REGION.	COUNTRY.	EUROPEAN NATION.

6. What advantage to trade arises between continents or parts of continents lying on different sides of the equator? 7. What regions of Africa have the best chance for future development?

8. Why did England want to build a Cape to Cairo railroad? Would you want to ride over it? How long would it take you to ride the whole distance at twenty miles an hour, ten hours a day? Has the road been built all the way? 9. Trace out the principal trade routes between Africa and Europe (Fig. 9); between Africa and America; between Africa and Asia. 10. Compare the difficulties of the early explorers in this region with those met by explorers in the Arctic and Antarctic regions.



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Fig. 565. Spreading coffee in the drying yard of a plantation near Sao Paulo. Do you see the rows of coffee trees on the distant hills? Why is it easier to export coffee than bananas?

SOUTH AMERICA

THE CONTINENT

785. Location and climates.—If continents in the same latitude have the same climate belts, what African belts would you expect to find repeated in South America south of the equator? north of the equator? If South America reached as far north as Africa, what climate belts would it then have that it does not now have?

How many miles farther south does South America go than South Africa? This southern region is the only part of South America having a kind of climate not found in Africa.

786 A little used continent.—South America was settled by Europeans before North America was settled, but, because of its surface and climate, most of the continent is yet almost unused. Much of this continent is difficult of access.

NOTE.—If anyone should find it necessary to study South America before studying Africa, it is recommended that Sections 743 to 748 be used as an introduction to South America. They explain the tropical climate, a subject which is comprehended most easily when studied in relation to Africa.

Back of the low, hot swamp that lies along much of the Brazilian coast, there is a steep mountain much like the Allegheny front at Cumberland, Maryland. (Fig. 241.)

Along the entire west side of South America, nature has raised an immense barrier, the longest and least broken mountain wall in the whole world. On the east, the Amazon River offers a good ship road far into the continent, but this river valley does not invite settlers because it is a hot, wet jungle of enormous size.

It is no wonder that the settlement of South America, except along some coasts and the plains of Argentina, has been slow.

Large areas in South America have almost no people at all. In the wild places of the interior there are many tribes that have never seen a white man. At least one tribe has the habit of using the dried heads of enemies for ornaments, although these same Indians have been very kind to travelers.

How many railroads can you find on the

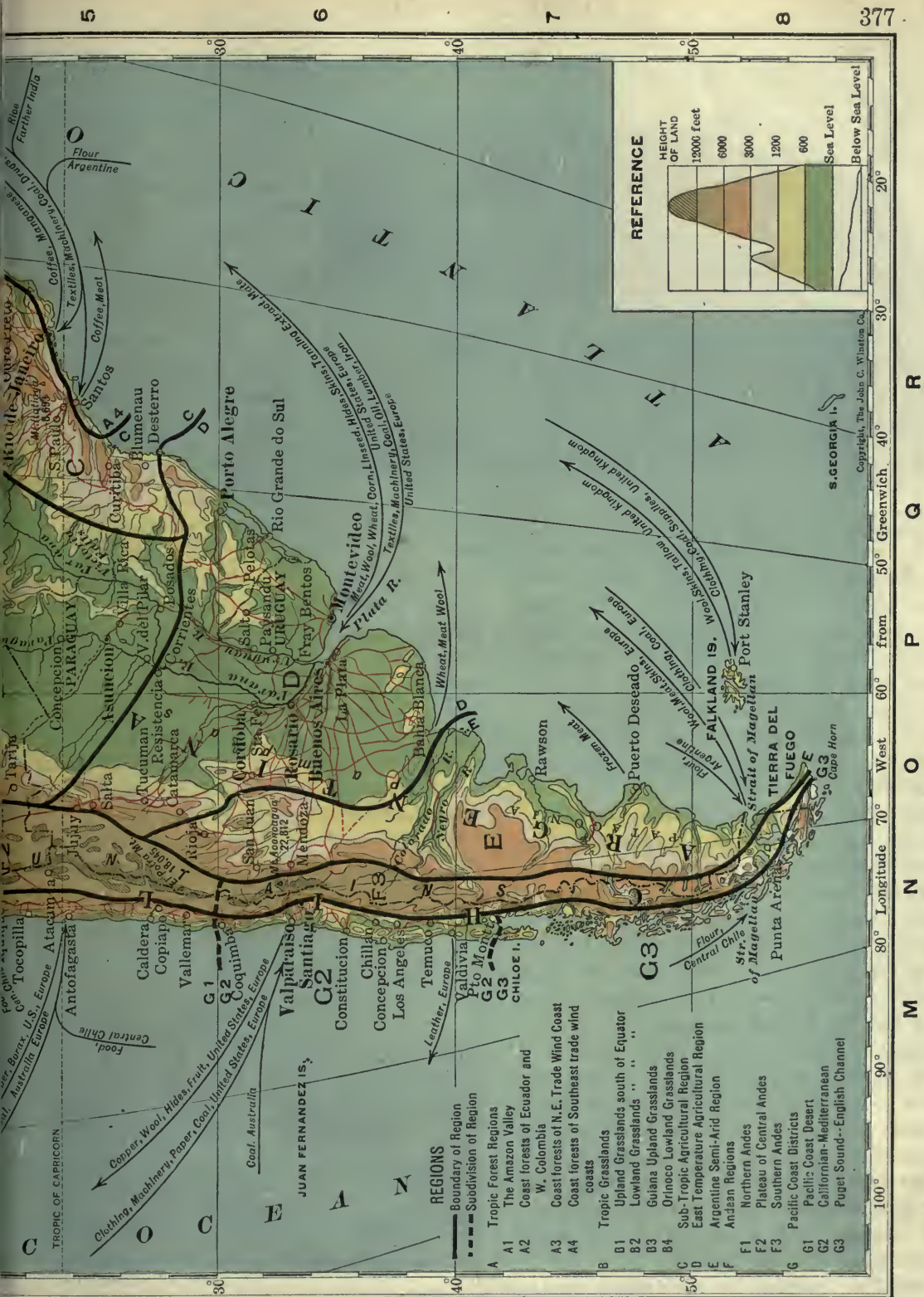


Fig. 566.



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Fig. 567. Cattle of an English beef breed beside the shade trees near a well on an English-owned estate in the pampas. In what American states do we find such land, good for grass, corn, and wheat?

line between the easternmost and westernmost points of South America (Fig. 566), and between the western point of Paraguay and the northern point of Guiana? How many miles between these points? It is said that South America has more unexplored land than Africa. It certainly has more unused land than Africa. Compare the population of the two. (Appendix.)

787. The natives of South America.—Europe, Asia, and North Africa were settled by many different migrating peoples, so that now they have many races. The natives of South America and those of North America were all much alike when Columbus came. They are supposed to have been of stock that, in the days before history began, came from Asia by way of Alaska.

When South America was discovered, most of the natives lived in villages and tribes, much as did the Indians of the United States. But in the plateau of the central Andes there was a real empire—the Empire of the Incas. Unluckily for the Incas, they had great stores of gold and silver, and this fact changed the whole history of South America.

788. The coming of the white man.—Soon after the time of Magellan, stories of

Inca gold and silver attracted bands of Spanish and Portuguese adventurers, — half conquerors, half pirates,—and the struggle to possess the riches began. The Portuguese took Brazil, and the Spaniards took all the rest of the continent except Guiana. Few Spanish women came, and many Spanish men married Indian wives. The Indian mothers raised their children in the Indian way. These people of mixed Indian and Spanish blood are called “mestizo”. Even to this day most of the people of Colombia, Ecuador, Peru,

and Bolivia are pure Indians or mestizo.

Very different was the settlement of the United States and Canada nearly a hundred years later. The stories that early explorers took back to Europe from North America told of a land good for farmers. Groups of European people, who had learned to govern themselves, came to North America to make new homes in a land where they could raise their children in their own way.

We can now understand the differences that we shall find between the people of



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Fig. 568. A monument overlooking the harbor of Valparaiso.

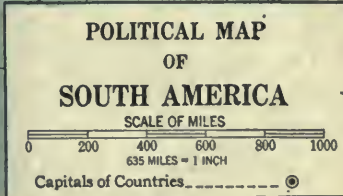


Fig. 569.



Courtesy U. S. Dept. Agr.

Fig. 570. A "port" on the Upper Parana River as it flows through the Tropic Grasslands. Trees line nearly all grassland stream banks.

the United States and Canada and those living in South America.

789. Coming of the negro.—After the Portuguese had settled on the east coast, and had found that the natives would not make good slaves to work on their sugar plantations, they bought negroes from the slave traders on the coast of Africa. To this day most of the people of eastern Brazil between 20° south latitude and the Amazon River are partly or wholly negroes, with here and there a little Indian blood. Most of those from the east point south to Rio de Janeiro are mulattoes. There is no color line among the common people of Brazil.

790. The climates for the white man.—In one part of South America the races of Europe have taken possession of the country. In Chile, Argentina, Uruguay, and Brazil up to Rio de Janeiro, the people are nearly all white, and here are found the best governments in all South America. This region has railroads, large cities, heavy trade, and the same kind of crops and living that we find in the cooler parts of the United States.

II

Spanish is the official language in all of South America except Guiana and in Brazil, which was settled by the Portuguese.

791. The new immigration.—Since 1890 there has been heavy emigration from Italy to Southern Brazil and Argentina, so that the white population south of the tropic of Capricorn is nearly equally divided among Spanish, Portuguese, and Italians.

792. The population of the continent.—A good census has never been taken over much of South America, but according to estimates the continent has about half as many people as the United States, and about as many as the United Kingdom. They are estimated to be:

8 to 9 million pure Indians.

13 million mestizos.

15 million whites.

12 million negroes and mulattoes: 10 million of these in Brazil; the rest in Guiana, Venezuela, and Colombia.

The continent therefore has a very mixed population. Whites and mestizos often scorn the other classes.



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Fig. 571. A public square and the capitol, Buenos Aires. Compare this building with the capitol at Washington (Fig. 235).

QUESTIONS

1. What is the area of South America? How many countries with the area of the United States could be placed within the continent? What is the area of your state? 2. Give the population of the United States; of your state; of South America. 3. How many races can we find in South America? Where is each? 4. Determine from your world map the following table of distances: Para, Brazil, to London; Panama to New York City; Montevideo, Argentina, to Paris, France. 5. What fraction of the continent is within the tropics? 6. Might parts of South America be said to receive much more or much less rain than they need? (Figs. 540, 541.) Give reasons for your answer. 7. What differences do you note between the character of the coast lines of South America and of Europe? 8. How much of the coast is paralleled by high mountains or plateaus? by low, hot tropical forests? 9. Think carefully of your answers to the above questions, and give reasons why the population of South America is but one-half of that of the United States.

10. What is the difference between the average January and July temperatures in the widest part of North America? of South America? Explain the difference. 11. What motives led the English to North America? the Spaniard to South America? Which made the better colonist? Why? 12. Why should we not refer to South America as Spanish America? 13. Study the elevations (Fig. 566), latitude, and rainfall of South America, and tell what kinds of products you think might be grown on this continent.



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Fig. 572. An Andean "freight train" going down to La Guaira. Was this picture taken in the rainy season?

14. Make the following comparisons:

	EXTENT	AVERAGE HEIGHT.	CHIEF PEAKS.	WHICH THE GREATER BARRIER? WHY?
Andes...				
Rockies.				

15. Show points of difference and similarity between North and South America, using the following outline: Location; Character of coast; Surface; Climate; People; My choice for a home.

THE TROPIC FOREST REGIONS

PART I.—THE AMAZON VALLEY

793. The equatorial river.—Two great equatorial rivers, the Kongo in Africa and the Amazon in South America, reach the Atlantic near the equator. The Amazon has more water than the Kongo; more, indeed, than any other river in the world, because its valley has both the northeast and the southeast trade winds (Figs. 540, 541) to blow moisture from the Atlantic into the heart of South America. What proportion of South America along the equator drains into the Pacific? into the Atlantic? (Fig. 566.)

The Kongo has falls near its mouth, but the Amazon valley is so flat that large steamers from New York and Liverpool can go to Manaos, 1000 miles up the river; and smaller ocean steamers go on to Iquitos, 2500 miles from the sea—farther than Denver is from New York. Although the Amazon is navigable 425 miles above Iquitos, the trade of the whole great valley is small. It has very few people.

794. The jungle.—In this river valley the climate is much the same as in the Kongo (Sec. 727), and here, even more than in the Kongo, nature has thus far been more powerful than man. Here (Fig. 566, A1) the forest owns the earth. Nature builds up forest faster than man has been able upon the whole to cut it down. This is not a land of fields and farms. There are no roads except the rivers. The canoes of the natives and the gasoline and steam launches of the white man pass up and down streams where they are not choked with fallen trees.

This forest, one of the largest in all the world, is of little value for lumber. Most



Courtesy Wm. Farrabee, The University Museum, Phila.

Fig. 573. The home of a chief of rubber gatherers on the Amazon bank. How many signs of flood can you see? What disadvantages would the flood bring?

of the trees have crooked trunks and worthless, soft wood. The good trees are scattered far apart and tied to many others with creepers and vines, so that the work of getting them costs more than the tree is worth.

795. Floods.—Each day during the rainy season, for weeks at a time, the rain comes dashing on the forest leaves with a roar like that of a railroad train. It beats into every crack and crevice of the houses. The rivers rise and water creeps into the forest. Sometimes the hunter may wade all day long in water that covers the level land. Many of the houses in the river towns are built on poles driven into the ground (Fig. 573). Even the chicken houses are put on stilts, and the poor birds must spend the rainy season in the house. From some places it is a hundred miles through the forest to the nearest dry land. In one place an American explorer traveled in his canoe among the tree tops, marking his way with a hatchet.

796. Tribes buried in the forest.—Is it any wonder that this is a land of few people? Some tribes live on the higher land between streams, in places that are harder to reach than oases in the desert of Sahara. These places are cut off from the rest of the world by the thick forests, and also by lowlands flooded several feet deep for months at a time. From time to time some explorer

finds people who have never before seen a white man.

797. Pests.—The tropic forests of South America are lands of pests. We might say that this is the land of the insect rather than of man. Mosquitoes are so thick that the traveler often wears gloves in hot weather, and has a net around his face and neck.

The vampire is one of the many kinds of bats living in these woods. At night one must be careful to cover his head and feet with mosquito netting; otherwise the vam-

pire may slip into the tent and bite a hole in one's nose, or perhaps in a toe, and then suck the blood. No stock farmer can succeed, because the vampires kill all his unprotected chickens and even his horses and cows.

Hungry alligators lie in wait in the rivers. One of the eight hundred kinds of Amazon fish has teeth so sharp that it can bite a piece out of a man, after which other fish, smelling blood, will come racing to eat the man alive. Lovers of the water are careful where they swim in this region. The boa

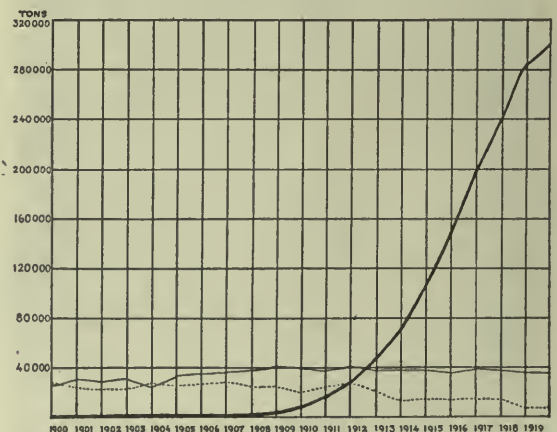


Fig. 574. Graph showing world production of rubber. What does the increase of plantation rubber in the Far East tell you about the prosperity of the city of Para, or Belem, as compared with Singapore? (Sec. 706.)
Heavy line—Plantation-grown, mostly in the Far East.
Fine line—Grown in the Amazon Valley.
Dotted line—All other places.

constrictor climbs the forest trees, and the jaguar crouches in the branches ready to spring upon its prey.

798. Rubber.—The only important industry of this vast forest region is that of gathering rubber. This is done by native Indians, mestizos, and mulattoes, from the east coast of Brazil. In the dry season they work hard cutting paths through the jungle to reach the scattered rubber trees, from which they gather the sap each day. In the rainy season the people have to leave the rubber camps, and they gather in Manaus and smaller river towns. They speak of these towns as "end of troubles," because they go to them in the season when they do not work. While the flood covers the forest, the people loaf and often listen to phonographs, and thus they pass the time pleasantly. A little of the rubber goes over the Andes to Pacific ports, but most of it goes downstream to Para, or Belem, which for a



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Fig. 576. A cacao bean harvest beside a tropic stream. What are the different men doing? How are these beans made into cocoa and chocolate?

long time was the greatest rubber market in the world. Why is it not so now? (Sec. 705, Fig. 574). Most of the great Amazon forest belongs to Brazil, but other countries own some of it. What countries are they?

799. Cacao and Brazil nuts.—The climate of this forest region is perfectly suited to the cacao tree. (Sec. 800). There are a few cacao plantations near the mouth of the Amazon, and room for thousands more.

A few of the Brazil nuts that grow wild in the forests are gathered for shipment to northern lands. Millions of pounds of them rot.

QUESTIONS

1. Make use of the following outline to write a brief review of conditions in the Amazon Valley for your school paper: (a) Surface; (b) Temperature; (c) Rainfall; (d) The rivers; (e) Forests; (f) Pests; (g) Products; (h) Chief cities. 2. What is the relation of Para to the rubber industry? What name do we give to the rubber of this region? Why? 3. How do you think the development of the rubber plantations of the East Indies, and the resulting lower price of rubber, affected the price of a building lot in Para? How did they affect you? 4. Would you prefer to depend upon wild or cultivated rubber for supply? Why?

5. Compare the two great "Fathers of Waters" as follows:

	AMAZON.	MISSISSIPPI.
Length of Navigability.		
Direction of Flow		
Trade		
Flood Problem		
Commercial Importance		



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Fig. 575. The wet cacao beans in Trinidad, British West Indies, are piled in heaps to let the pulp ferment. They are then polished by bare feet. Why does Trinidad have the tropic forest climate?



Fig. 577. The shell in which a dozen or more Brazil nuts grow. This is one of the many 'free foods' produced by nature and mostly wasted in the tropic forest.

6. Which is of more commercial importance, the forests of the Amazon or the forests of the Pacific coasts and mountains? Why?

7. Locate the Rio Teodoro. What interesting facts can you find about this river? 8. Someone has said that the Amazon Valley could raise food sufficient for the entire United States. What changes must take place before this can be possible? 9. Make a chart for the Amazon and Congo rivers similar to the one in Question 5.

PART II.—THE COAST FOREST OF ECUADOR AND WESTERN COLOMBIA

800. Jungle and cacao.—From the Gulf of Guayaquil northward to the Isthmus of Panama is another doldrum land. The coast plain is damp, rainy, hot, swampy, and forested, like the Amazon Valley. Like the Amazon Valley most of it is unused, but the section near the Gulf of Guayaquil has many cacao plantations, which furnish two-thirds of the exports of all Ecuador. (Fig. 608.) Guayaquil, the seaport, has long been known as unhealthy. Conditions there are better now, because swamps have been drained, and water no longer stands in the city streets. A railroad from Guayaquil goes up to Quito, the capital, on the high plateau, and there the climate is cool and healthful.

801. The Colombian section.—Guayaquil is 835 miles distant from Panama. On the swampy coast between these two places there

is but one port, Buenaventura, having a route of any importance to the interior, and that is only a mule road. Professor E. A. Ross, who made a journey inland from this place, said: "Behind Buenaventura, and reaching to the foothills of the Coast Range, is a malarious jungle, called the Choco, where it rains every day. Here no one lives save the descendants of the negro slaves. . . ."

"They live in palm-thatched bamboo huts, raised about a yard above the ground. The bamboos of the frame are tied together with lianas (vines), and the sides are of bamboo split and flattened into a kind of board. The builder needs no hammer, saw, nail, or screw; only the machete. Nor does the jungle black enslave himself to hoe or spade or plow or clothes. He slashes away the jungle, starts a patch of plantains, or cooking bananas, and sows a little corn. His sugar cane he crushes in a hand-mill, and boils the juice down to sugar. He fishes, hunts, converts molasses into rum, and rolls stalwart cigars of his own tobacco leaf. So he eats, drinks, smokes, loafs, and lets time pass, with no vanities, no interests, no ideas, no standards, no outlook, no care for the future. . . ."

QUESTIONS

1. How is Mother Nature too good to her children who live on this coast? She will make you work much harder than they, but will pay you well. Explain. 2. What is the only product of commercial importance in the coastal strip? (Figs. 575, 576.) What products might energetic people produce in this region?

3. At one time Panama was a pest hole like Guayaquil. Tell how our army physicians made Panama safe for white men. (Sec. 376.) Might Guayaquil be made as healthful? 4. What connection can you suggest between poor government in Ecuador and poor health in the coastal regions?

5. How would good schools help the boys and girls to be healthy, energetic, and eager to make their homeland a pleasant place in which to live? When such boys and girls were grown up, what good things might they do to improve their country?

PART III.—THE FORESTS OF THE NORTH-EAST TRADE WIND COAST

802. Half-settled lowlands.—The north-east trades, blowing across the Caribbean and the Atlantic, bring much rain to the northern lowlands of Colombia, of Venezuela,

and of the three Guianas. (Figs. 540, 541.) Look at the map and see if you can tell why the Colombian section receives less trade-wind rain than the Guiana section.

These hot lowlands are good for sugar, cotton, cacao, rice, and many tropic crops, but the climate is so unpleasant that little of the land is used. There are villages of grass-roofed houses, but in all the wide plain of northern Colombia there is only one large, modern sugar mill. Rice, bananas, and coconuts are the chief food of the people. There are some Indians, and many negroes whose ancestors were brought over as slaves. Only a few of the people are white. Even in the cities of Barranquilla and Cartagena less than one person in ten is white, but some of these are often well-educated and have traveled in foreign lands.

Near Santa Marta an American company has large plantations, from which bananas are brought to this country. (Sec. 375.)

The natives of Colombia and Ecuador use a leaf fiber and weave by hand most of the Panama hats that we get in the United States. Sometimes a pack mule will come out of a forest path carrying several hundred dollars' worth of hats in the two bundles balanced across its saddle.

In northern Venezuela the Andes reach directly to the shore of the sea, leaving no room for a coastal plain. (Fig. 596.)

803. Unexplored forests.—The coast plain of the Guianas is mostly a great forest which is even less used than the plain of Colombia or western Venezuela. Indeed many parts of it are unexplored, and all of the people except a few forest Indians live along the shore where the trade wind blows. This wind is so constant, so moist, and so warm that plants seem to grow almost everywhere, on the trunks of trees, on rocks, even on the surface of the rivers. The giant water lily, the *Victoria regia*, has its roots in the mud and spreads upon the surface of the water its leaves as large as umbrellas, and its beautiful white flowers as large as dinner plates.

British Guiana, the chief crops of which are sugar and rice, has more agriculture

than Dutch and French Guiana together. Yet all the sugar fields of British Guiana would cover a space only ten miles by twelve; and all the rice fields, a space ten miles by nine. How long and how wide is this colony? Only $\frac{1}{450}$ part of it is under cultivation, and most of the work is done by people from India. They have been brought by the British government from their own crowded country to work in the empty lands of Guiana.

An important export of this district is balata gum, gathered by the natives from the trunks of trees in the forest, and used for making insulation for electric wires.

QUESTIONS

1. Show how the climate of this coast is kind to plants but very unkind to white men.
2. What countries are a part of the trade wind coast? Why do the trades bring rain to this region?
3. What is balata? Its use? How is it gathered? (Fig. 578.)
4. Name and locate the important coastal cities.



Courtesy The University Museum, Phila.

Fig. 578. A native of Guiana with his machete, bleeding a balata tree. How can he make his ladder by using only forest things?



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Fig. 579. The Monument of the Republic in the square at Para, Brazil.

PART IV.—THE FORESTS OF THE SOUTH-EAST TRADE WIND COASTS

804. A coast with big cities.—The part of the forested coastal plain over which the South-east Trade Wind blows (Fig. 566, A 4) has many more people than the sections north of the equator. On the lower slopes of the mountains, some of the land is well drained, and therefore better for farms than the flatter, wetter land close to the sea. It even has three large cities: Pernambuco (Recife), as large as Atlanta; Bahia, as large as Seattle; and Rio de Janeiro, larger than Cleveland or St. Louis. It was to this coast district that the Portuguese planters first brought negro slaves to grow sugar cane, more than four hundred years ago. Since this climate is very much like that of Africa, it is easy to see why the negroes here have increased in numbers more than have the white people. They are now free and live an easy and care-free life, working as little as they can. They are usually farmers, who often work patches of ground very much as their cousins do in Africa. Their gardens yield bananas, yams, sweet potatoes, and many kinds of beans. For bread a little corn is grown, but the

chief material for bread is a kind of meal made of the dried root of the cassava, or manioc as it is called in Brazil. (Sec. 367, Fig. 551.) To pay for cloth, knives, phonographs, and other imports, the people export some sugar, tobacco, and a little cotton. During our Civil War and the World War, the cotton crop along this coast was greatly increased; and during the food scarcity of 1918 and 1919, manioc flour and beans were exported to Europe to replace wheat and meat. In the Bahia district the chief export is cacao.

805. Rio de Janeiro and the Brazilian government.—Rio de Janeiro, the capital of Brazil and the trading place for a rich plateau region behind it, is a large and a very beautiful city. The hills around its harbor make it one of the wonderful sights of the world. (Fig. 585.) Recent improvements include good water works, a good sewage system, and the draining of the swamps to destroy the breeding places of mosquitoes. Once Rio de Janeiro was a very unhealthful place, but now it has become so healthful that the death rate there is no higher than it is in New York or Chicago. The chief export of Rio and of Santos is the coffee grown in the plateau district near by. (Sec. 818.)

Brazil is a republic with states much like our own, and with territories in the interior where there are very few people. Governors for the territories are sent out from Rio de Janeiro just as, in our country, they are sent out from Washington.

806. Conquering diseases.—These damp, tropic forest regions are a part of the world where nature with her heat, moisture, and sunshine makes plants grow most abundantly. They are, therefore, lands of great possibility if man can learn to live and work there. Already men have learned much about conquering the diseases that have killed thousands of people, and that have for so long held man terror-stricken. Yellow fever is a good example. This dreadful disease has been killing people on the coasts of tropic America since the time of Columbus. In 1880 it had much to do with

stopping work on the Panama Canal, which was not built until yellow fever was conquered. (Sec. 376.) It was so bad at Guayaquil and Santos that people dreaded to go there. Two things were in the minds of the people of Santos every day; one was the price of coffee, and the other was yellow fever. In 1899 surgeons in the American army learned that the disease is carried from one person to another by a certain kind of mosquito. Men at once began to fight the fever-bearing mosquito, and in fifteen years after 1905 Santos had no yellow fever at all.

An American health board has recently discovered that ninety-five per cent of the workers in the cacao plantations of Ecuador suffer from the hookworm, a disease which is curable, but which makes the people who have it feel so weak and tired that they want to do nothing but rest.

We now know that malaria, the greatest scourge of all the tropics and of many temperate lowlands, is also caused by a mosquito, and we know how to stop that disease, too. (Sec. 45.)

All of these discoveries make it quite possible that soon there will be a great increase in the use of tropic coast lands, and that they may be made to yield great quantities of bananas, banana meal, cacao, Brazil nuts, manioc, rice, rubber, coconuts, palm oil, and many other crops. If people there are prosperous, they will help to keep our farms and factories busy making things to trade with them.

807. Nature's greatest dare to man.—But there stands the vast, flat plain of the Amazon, with rivers thousands of miles long, whose floods creep through the dark, thorny, tangled, buzzing jungle. Man has not yet conquered this great valley. Perhaps it is one of the last places that he can conquer. Certainly it is the

greatest dare that nature holds out to him. If the Amazon River and its floods can be controlled and made to irrigate ricefields, cornfields, and banana plantations, the yield will be enormous. Doubtless the rich oil palm of Africa will grow as well in South America as the South American rubber tree grows in other tropic lands. (Sec. 705.)

Some day, perhaps, we may be running automobiles with alcohol distilled on the Amazon's banks, and feeding cows with coconut meal from all the rainy coasts of tropic America. But first man must defeat the mighty defenders of the region. It is still the land of the insect. Thus far the insect, the flood, and the fever have cut down man's army of invasion, and slain the children of the settler, so that his numbers have remained small.

QUESTIONS

1. What do the natives produce to sell to the outside world? 2. How has trade with the interior helped Santos and Rio de Janeiro to become great cities, with good schools and comfortable homes? (Fig. 584.)

3. What lessons might the people of the Tropical Forest Regions learn from the healthy condition of Rio de Janeiro and Santos? 4. Compare the four Tropic Forest Regions as follows:

NAME OF REGION.	LOCATION.	BOUNDS.	PRODUCTS.	CITIES.

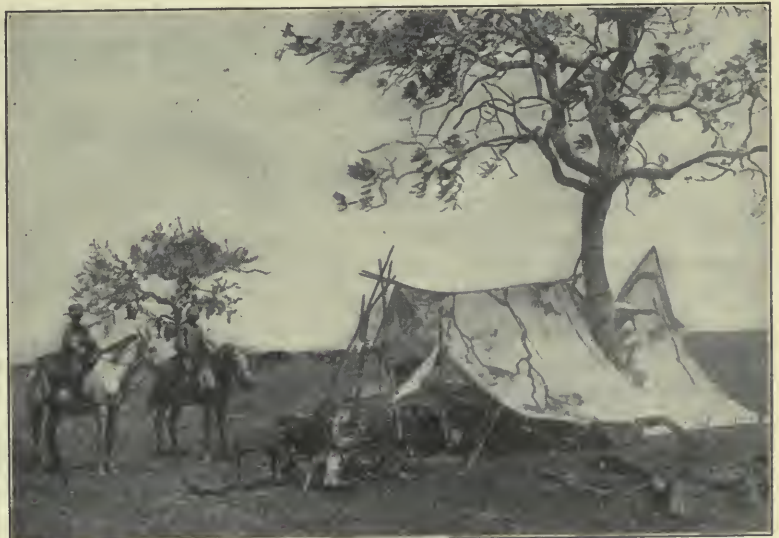


Fig. 580. Cowboys and their camp by a lone tree on the great expanse of the Brazilian grasslands.

Courtesy Wm. Farrabee, The University Museum, Phila.



From "Through the Brazilian Wilderness," Courtesy Charles Scribner's Sons

Fig. 581. Theodore Roosevelt saw these Grassland Indians along the upper Paraguay River playing "football" with their heads. He said, "They use a light hollow rubber ball, of their own manufacture. It is about eight inches in diameter. The ball is placed on the ground to be put in play as in football. Then a player runs forward, throws himself flat on his face and butts the ball toward the opposite side. An opposite player, rushing toward it, catches it on his head with such a swing of his brawny neck, and such precision and address that the ball bounds back through the air as a football soars after a drop-kick.

"The ball is never touched with the hands or feet, or with anything except the top of the head. It is hard to decide whether to wonder most at the dexterity and strength with which it is hit or butted with the head, as it comes down through the air, or at the reckless speed and skill with which the players throw themselves headlong on the ground to return the ball if it comes low down. Why they do not grind off their noses I cannot imagine." The team whose ball is not returned wins a point.

THE TROPIC GRASSLANDS

808. Resemblances to Africa.—Examine the maps of Africa and South America and compare the grasslands of the two continents in size and location. (Fig. 566, B1, B2, B3, B4.) Like the African grasslands, the South American grasslands have two seasons, one of which is hot and dry. During this season the grass dries up and the trees drop their leaves.

The other season is a hot, damp, muggy season of rains. Then the grass springs up, the trees come out in leaf, birds build their nests, and streams run swiftly. In some places the water stands about in pools. During the next dry season the pools and the smaller streams dry up. Then rivers, recently flooded, become shallow streams, trickling along their wide and almost empty beds, or dry up completely. (Figs. 540, 541, 557.)

PART I.—GRASSLANDS SOUTH OF THE EQUATOR

809. A great, empty district.—The great, empty district of Brazilian-Bolivian grass-

lands or savannahs extends all the way from the low plains on the east coast of Brazil to the Andes Mountains. What other regions touch it? This is not a place to which people go for pleasure tours. There are no steamers except on the upper Parana, and, except for one railroad line, travelers have to go on their own horses or in their own canoes, and carry their own supplies over hundreds of thousands of square miles. After crossing this region near the source of the Tapajos River, Theodore Roosevelt said of it: "At intervals along the trail we came on the staring skull and bleached skeleton of a mule or ox. Day after day we rode forward across endless flats of grass and of low, open, scrubby forest, the trees standing far apart and in most places being but little higher than the head of a horseman. Some of them carried blossoms, white, orange, yellow, pink; and there were many flowers, the most beautiful being the morning-glories." The Brazilians call this country of grassy plains the campos. In all of this wide savannah, large settlements can be found only in Paraguay and in a few small localities at the foot of the mountains in Bolivia, and near the coast of Brazil.

This region is much larger than all that part of the United States east of the Mississippi River. Most of it is a vast, waiting land, peopled only by scattered tribes of Indians, and a few settlements of half-breeds and white men. The natives live by hunting, fishing, or keeping cattle, and a little gardening. They have simple grass houses, or grass shelters on poles, but without walls.

810. High plains and low plains.—The eastern part of the grassland in Brazil is a

plateau. (Fig. 566.) On its eastern edge is the steep slope down to the sea like the one we shall see at Santos. (Sec. 817.) In some places near the sea, the wall rises suddenly three thousand feet and then slopes away gently to the west. This highland has less heat and less moisture than has New Orleans or Florida, and, therefore, it may become a land of white men, although as yet they have not settled it. The western part, drained by the upper branches of the Paraguay, the Madeira, and the Tapajos, is much lower, and in places is so flat that in the rainy season the water stands from three to six feet deep, with never a hill to be seen. Water thus covers twenty, thirty, or even forty thousand square miles, an area several times as big as Massachusetts. At this season people must go about in boats or live in houses on poles. The cattle must be driven to dry land miles away, where they can find something to eat.

There are trees and even forests along most of the rivers of the grasslands, because the moisture keeps trees growing in the dry season. There are also patches of forest mixed with the grassland in many parts of the plains. This is the home of the deer, the jaguar, and many other wild animals. One of the most dangerous animals here is a kind of small wild pig called a peccary.

These animals go in great droves, and will attack men on horseback. They hamstring the horse and kill the man. Hamstringing is cutting the heel tendon, an act which makes men or quadrupeds helpless.

811. The beginnings of settlement.

—In 1800, Indians and wild animals roamed over Kansas, Iowa, and the plains and mountains beyond. There were only a few settlements along the Mississippi River. To-day,

the interior grassland plain of South America is in almost the same condition. The white man with his railroads, his steamboats, and his trade is at work only on the edges of this district. The solitary rancher is very likely to be half Portuguese and half Indian. He lives in a one-story house with walls of sun-dried brick and roof of grass. As soon as a baby boy can stand up, he wants to ride a



Finch & Baker, U. S. Dept. Agr.

Fig. 583. Cattle in Argentina, Uruguay, and Chile. Why such great difference in density?



Courtesy Armour & Co.

Fig. 582. A slaughter house and freezing plant built, owned, and managed by an American company at La Plata, a short distance down the river from Buenos Aires. What signs do you see of good transportation facilities?

horse, for he sees his father galloping about on horseback after the cattle that pasture on this great, unfenced plain, which has only grass and scattered trees as far as one can see.

One of the few built-up places of the grasslands is at the foot of the mountains in Bolivia, where needed food is grown for the miners at La Paz and other towns on the Andean plateau, and carried up to market on muleback.

The Brazilians have built a few railroads to reach the cattle ranches in the southeastern edge of their grasslands, but only in that part of Paraguay between the Parana and the Paraguay rivers may this region be said to be settled. Even then, Paraguay has only fifteen people per square mile.

812. Paraguay.—Because there are steamboats on the Parana River, the people of Paraguay have a better chance to trade than the people of any other part of this interior region. Most of Paraguay's million people are Indians, negroes, or of mixed blood, chiefly Indian. There are a few Spaniards, and Spanish is the language of the government. Most of the people can neither read nor write, and so their republic does not have a very good government.

Since Paraguay is about the same distance from the equator as Florida and Cuba, oranges and early vegetables can be grown there. These go in oxcarts to the boat landings, for shipment to the cities on the River Plata, just as Florida sends similar products by train to the colder parts of North America.

Another Paraguayan export is maté, the dried leaf of a low tree of the holly family. Forests of it grow wild in Paraguay and in the neighboring parts of Brazil, where it may often be seen drying on the grass near a thatched house. The people of this region have long used this leaf for tea, and it is now being shipped from both Paraguay and southern Brazil to Argentina, Uruguay, and even to southern Europe. A little comes to New York. To prepare maté for market is less work than to prepare tea, so maté is not a costly drink. In the cooler parts of South America, groups of people may often

be seen gathered comfortably around a gourd of hot or cold maté.

Most of the money that the people of Paraguay receive is from hides, meat, maté, and the fruit and vegetables they send to the cities on the lower Plata. The Paraguayan storekeeper gets his drugs, knives, clothes, and other wares from the wholesale stores of Buenos Aires and Montevideo. Where does the wholesale merchant get his wares?

813. The new cattle industry.—The price of meat in Europe has been going up steadily since the year 1900, and when the people of Argentina and Uruguay began to ship fresh meat to Europe, the price of cattle rose so high that makers of *tasaño*, or jerked beef (dried and salted), had to leave Argentina and Uruguay and move their plants to the tropic grasslands in Paraguay, and to the Brazilian states of Matto Grosso, Goyaz, and Minas Geraes, where cattle are cheap. Jerked beef will keep in all weathers and climates, and has long been shipped from the ports of the River Plata to Cuba and many tropic countries.

During the World War, there was a great meat-packing plant built in Paraguay. Sheet tin was sent from Pittsburgh to this packing plant, to be made into cans to carry meat back to France. Americans have built meat-packing plants at Rio de Janeiro and Santos, and Brazil has built a railroad to Goyaz in the savannah country where the herds are increasing.

814. A future meat supply.—This vast land of the savannahs, or tropic grasslands, more than half as large as the United States, is one of the few places where the world's market may possibly get a new supply of cheap beef and hides. It is unlike the African grasslands in not having a strong native people, but there are some Indians there, and immigrants are going into the Brazilian section. Among the immigrants are some Japanese. There is every reason to expect that energetic men from somewhere will push their cattle ranches into these grasslands during this century, just as ranches were pushed into the grassy plains of the middle of North America in the last century.

PART II.—THE GRASSLANDS NORTH OF THE EQUATOR

815. The South American Sudan.—Within what degrees of latitude does the Sudan lie? (Fig. 445.) the northern grasslands of South America? (Fig. 566, B3, B4.) Compare the size of the two. What river valley and what uplands comprise most of the north tropic grasslands of South America?

Like the savannahs of Africa, Brazil, and Bolivia, the northern grasslands have a season of drenching rains and up-springing grass, followed by a season of sunshine, drought, and dead grass. Then fires often burn the dead grass for hundreds of miles, and great clouds of smoke darken the skies.

816. High grasslands and low grasslands.—We have just seen (Sec. 810) that the southern grasslands are low in the west and high in the east. The same is true in the north, with the Orinoco Valley in the west, and the highlands of Guiana in the east. These highlands are unused by civilized man. They are not even well-explored. They are hard to reach and hard to cross. The hot jungle plain between them and the coast is wider than it is in Brazil. The uplands are not wide-stretching, nearly level plateaus like those of Brazil or Africa. Instead, they are cut into many parts by sharp valleys. You might have to spend a half day crossing a small stream. You would be scrambling one or two thousand feet down steep cliffs, chopping your way through tangled vines and thickets, and then climbing and chopping your way up the other side to a small tract of level, grassy upland with deep, jungle-filled valleys all around it. There are grass and gold in this country, but men have not used the grass or dug the gold. There has been some gold mining on the edges of the region for a long time, but these grasslands may have to wait a long time for transportation.

The low grasslands of the Orinoco, like the savannahs of Bolivia and Brazil, are also almost unused. They might support millions of cattle, but the climate is hot, and the government of Venezuela is very bad indeed.

No one knows when his property may be seized by some general who is out with an army to live on the country until he can drive out the other generals and become president. These two things, the bad government and the hot climate, cause this region to be almost unused. There is so little trade that only one or two small steamers come up the great river Orinoco as far as Ciudad Bolivar. Since the World War English companies have begun to buy up cattle ranches on the Venezuelan llanos (plains).

QUESTIONS

1. What do your maps (Figs. 540, 541) tell you about the rains in these regions? Does such rainfall make dense forests, or few forests and much grassland? 2. Would you prefer to live in the plateau grasslands or in the lower grasslands? Why? Would you prefer to live on the grasslands north of the equator or on those south of it? 3. These regions include parts of what plateau south of the Amazon? north of the Amazon? What river valleys south of the Amazon? north of the Amazon? 4. Which rivers in this region are navigable? (Fig. 610.) How may the railway around the Falls of Madeira cause changes in the southern grassland region? Would you expect to find falls in the rivers of the Brazilian savannah? Why? What use might be made of these falls?

5. What does the word savannah mean? 6. Suppose the Brazilian Government gave you 100 square miles of land at latitude 15° south, and longitude 50° west. If you should live on it, what would you do? 7. What is the price of a pound of beefsteak where you buy food? How much must you pay for a pair of shoes? Would immense herds of cattle on these grasslands have any influence on the prices of things that you use? 8. Why might Paraguay be called the Florida of South America?

9. Brazil plans to locate a new capital just east of Goyaz. Give three reasons for so placing the capital city. 10. Fill out the following chart:

THE GRASSLANDS OF THE WORLD

TOPIC.	AFRICA.	UNITED STATES.	SOUTH AMERICA.
Names.....			
Reason for dryness.			
Rivers.....			
Inhabitants:			
Number.....			
Race.....			
Customs.....			
Homes.....			
Products.....			
Wild animals.....			
Chief products.....			

11. If maté were sold as widely as tea, what would be the effect upon the prosperity of the natives of Paraguay and southern Brazil?



Photo. Wm. Thompson

Fig. 584. The railroad station at Sao Paulo, Brazil. Have you ever seen one so handsome? What product has enabled the railroad to build such a station?

THE SUB-TROPIC AGRICULTURAL REGION

817. A mountain with only one side.—

In southeastern Brazil, on a corner of the low plateau, is the sub-tropic region which has long furnished most of the coffee that is used throughout the world. The people on the deck of a coffee ship steaming from Rio de Janeiro to Santos can often see, near the shore, a high mountain covered with dark green forest. In a long distance this unbroken mountainside has only one place where a railroad climbs it, and that is at Santos, where a double-track railroad connects seashore with interior. As we go up this railroad, we are surprised to find that it is almost as steep as a flight of stairs. The cars are pulled up by cables, which are run by great stationary engines. The cables pull the trains from power house to power house. As the car is pulled up and up the mountain, to a height of nearly half a mile above the level of the sea, one may catch wonderful glimpses of the sea through the forests that overhang the track.

On reaching the top, we are surprised to find that we have climbed a one-sided mountain, for the other side does not decline, but stretches away in a plateau to the westward.

(Sec. 272.) In some places the land is quite level; elsewhere it is as beautifully rolling as the Piedmont of Virginia. (Sec. 259.)

The train finally brings us to Sao Paulo, a city larger than New Orleans. In the United States no city without water transportation has grown so large. Sao Paulo is the capital of a rich state, and the trade center of a prosperous district. Sao Paulo also has many people, and much business that would naturally be in the port of Santos if the climate there were as cool as that of New York

or of London. Sao Paulo has fine streets, trolley cars, and many factories making boots and shoes, and weaving cloth from cotton, wool, and jute. Nearly all of the coal used in Brazil must come from Europe and the United States; waterfalls furnish power for the machinery in many Sao Paulo factories, for trolley cars, and for lighting the streets. Sao Paulo is sometimes called an electric city. White people wearing clothes like our own go to and fro as in any American city. We might think we were in the United States if we did not listen to the people's talk. What is their language? (Sec. 790.)

Find the place near the coast of Brazil that is the same distance from the equator as the tip of the Florida peninsula. This Brazilian region is cooler than Cuba and south Florida because it is a plateau two or three thousand feet in height. The summers are rainy and warm like those of Florida, Cuba, and Porto Rico; but the winters are cool, with little rain, and frost sometimes injures the crops, as it does in parts of Florida.

818. Coffee.—You recall (Sec. 384) that fine coffee grows in the small uplands of Porto Rico. Here in Brazil is a large upland much like that of Porto Rico. The city of Santos is the coffee capital of the world. Just as

cotton has long been the chief crop of many parts of our own south, so coffee has long been the chief crop of the region inland from Rio de Janeiro and Santos. Many of the plantations are on hills, so that they have well-drained soil, as well as frost drainage. (Sec. 184.)

Most of the coffee crop goes to Sao Paulo, and then down the mountain by the double-track railroad to Santos, which has better port facilities than many North American ports. How far is it from Santos to New York? to Lisbon?

If coffee is high in price, the people of Santos and Sao Paulo are prosperous, and buy many things from Europe and America. If the price of coffee is low, the people are poor, and therefore buy but little.

819. Other crops.—For many years the coffee region, like our own cotton region, sold one product and bought almost everything else: coal from England; locomotives from the United States and Belgium; oil and gasoline from the United States; clothes from Europe; flour and meat from Argentina; iron, automobiles, and sewing machines from the United States; dried codfish from Newfoundland and Norway. During the World War, when trading ships were scarce, the people of this sub-tropic region began to grow large quantities of crops of which they had previously grown but little. In a short time the cotton output of the Brazilian state of Sao Paulo had increased sixfold, and shiploads of corn, rice, and dried beans were being exported. Then, also, this part of South America began to send canned beef to France from the new modern packing houses built in Sao Paulo and in Rio de Janeiro by men from Chicago. The cattle owners are improving their stock by bringing better breeds from Europe. This sub-tropic plateau has many undeveloped resources.



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Fig. 585. Looking down from Sugar Loaf, one of the many peaks overlooking the city and harbor of Rio de Janeiro, justly famed as one of the most beautiful of city locations.

820. Iron ore.—In a short time this region may be exporting more iron ore than any country in the world. Special ore docks have been built near the city of Victoria, and a railroad four hundred miles long has been built westward into the interior of the Brazilian state of Minas Geraes, to reach mountains that have nearly twice as much iron ore as those near Lake Superior. (Sec. 334.) Some of this iron will be smelted for use in Brazil, but it is expected that the ore will be shipped more and more to the furnaces of North America and Europe, because it is the richest iron ore so far discovered.

821. Lumber.—On the southern part of this plateau is a large pine forest, much like the pine forests of Florida. Trees taller than a three-story house cover an area several times as large as Massachusetts, and because railroads have been built only to the edge of this forest, most of it is yet almost untouched. However, the export of lumber from the port of Curitiba has already begun and may become very large.

822. A land for immigrants.—This is a region of great promise for growth in trade and industry. Most of the people are white. It is the first part of South America where large numbers of immigrants are seeking homes. Already hundreds of thousands of



Photo. Publishers' Photo Service, N. Y.

Fig. 586. Cattle of British breed feed on the Argentine Pampas. Compare these cattle with those in Figs. 107 and 629. Each year there is a wonderful show of pure-bred cattle in Buenos Aires, as there is at Chicago.

Italians have gone there. Immigrants keep arriving and we may expect this region to build up as our own southern states are building up. This is by far the most pleasant and wholesome part of South America that we have yet studied.

The corresponding part of Africa, on the slopes of the Drakensberg Mountains, is very small. (Sec. 769.)

823. Many resources.—This region promises to have a more varied industry than any other part of South America. No other part has so many different natural resources. It can have within its own bounds coffee, cotton, corn, beans, and many other agricultural crops. The meat industry is increasing. The region also has minerals, lumber, and water power, and a plateau high enough to be as healthful in climate as the southeastern part of our own United States. Already in Rio de Janeiro and Sao Paulo there are many factories where English machines, driven by water power, make cloth from Brazilian cotton; and in the near future great smelting plants may arise.

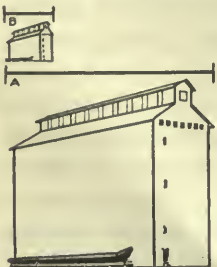


Fig. 587. Wheat production (1919-20):

A. United States,	860,690,000
B. Argentina and Uruguay . . .	203,940,000

QUESTIONS

1. Where did your grocer's coffee probably come from? 2. Why should Brazil wish to keep on friendly terms with the United States? With what countries must the United States compete for trade with this region? 4. What training should our salesmen have to be successful? 5. Locate Sao Paulo. How large a city is it? Why do its people have so many conveniences, while the Toba Indians live so poorly? (Fig. 591.) 6. What part of Africa does this region resemble? Why?

7. Should Brazil export her iron ore or try to use it at home? 8. What should happen in the Brazilian highland when railroads are built through it? 9. Santos and Rio de Janeiro are the gateways to this good land. How are they connected with the plateau? How do they help the inhabitants of the plateau? Trace the steamship lines leading out from these cities.

10. Why do great numbers of Europeans migrate into this region? 11. Is there room for more immigrants? 12. How many people should a country have?

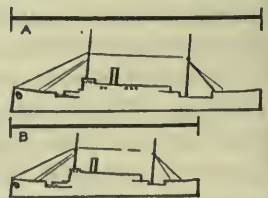
EAST TEMPERATE AGRICULTURAL REGION

824. Another southern United States.—Find the latitude of Norfolk, Virginia, and that of Buenos Aires. Each city is on the east side of a continent. Can you see why they should have similar climates? Do the

Fig. 588. Wheat export (bushels):

A. United States	150,500,000
B. Argentina and Uruguay . . .	110,098,000

Why does the River Plata Region export a greater part of her wheat crop than the United States does? (See Fig. 587.)



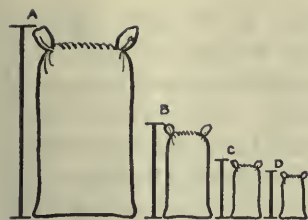


Fig. 589. Wool export of four important nations (1909-13 average)
Million pounds

A. Australia . . . 676
B. Argentina . . . 328
C. New Zealand 194
D. Br. So. Africa 164

maps also tell you why southern Brazil and Georgia should have similar climates?

The East Temperate Agricultural Region of South America (Fig. 566 D) resembles in climate the region between the South Atlantic Coast of the United States and the Great Plains in Oklahoma. The South American region is smaller, but it has the same lessening of rainfall as the distance from the ocean increases, a climate feature which makes similar vegetation belts in the two regions. First comes forest, then grassland good for corn, then grassland good for wheat. The South American forest covers most of the Brazilian part of this district and the neighboring lands in northeastern Argentina.

West of the lower Parana is a splendid plain called the pampas. It is treeless, rich, nearly level (Fig. 586), and good for corn in the east, then, farther west, good for wheat. The western boundary of the grain land is a climate line like that at the western end of our own grain region (Sec. 57) in Kansas and Oklahoma. The plain, now too dry for much farming, stretches on to the Andes, as our own plain goes on to the Rockies.

825. The early days—ranching.—Let us see why the Spanish settlers on the banks of the Plata found it easier to make a home there than the English did on the banks of the James, or along the shores of Massachusetts. The pampas of eastern Argentina are treeless and covered with rich grass. These plains, spreading away to the west and northwest for hundreds of miles, are one of the greatest natural pastures in the world.

The settler did not have to cut down trees, dig up stumps, pry out stones, or fight with bushes and briars. The winter is frosty, but usually mild. There is no snow cover; animals can pasture all the year. The early settlers brought horses, sheep, and cattle from Spain. The animals ran almost wild on the grassy plains, and increased like mice in a pantry.

In those days American meat could not be sold in Europe, so for two hundred years the Spanish ranch owners killed their cattle and sheep, and sold only the skins, the wool, and the tallow. Horses were kept because the hair from their tails and manes was sold to make haircloth. In the middle of the nineteenth century an Argentine horse brought a fixed price, just as a glass of soda water does with us. An unbroken horse was worth \$2.50. If he was trained, ready to use, he was worth \$5.00. An especially good riding horse was worth \$10.00 to the Argentine gaucho, or cowboy, a rough fellow, half Indian, half Spaniard, who spent most of his time on horseback.

After a time the people began to make *tasajo*, which is beef so salty and dry that, like dried codfish, it will keep in hot climates. *Tasajo* has been much used in tropic America. (Sec. 813.)

826. The rise of agriculture.—During all this time the people of Buenos Aires imported flour, just as the people of Cuba do to-day.



Courtesy International Harvester Co. of America

Fig. 590. Hauling wheat to an Argentine railway. Can the wagons you know get through deep mud as well as these can? There are hooks on the ends of the axles and elsewhere, so that the cowboys can tie their lassos to the wagon, and help pull at a pinch. See the rope from the hub.



Photo. Underwood & Underwood, N. Y.

Fig. 591. A family of Toba Indians and their home in the scrubby forest of the Gran Chaco. What signs of trade with the white man do you see?

About 1870, people in the Argentine found that they could raise wheat. There was a market for wheat in Europe, so Argentina started on an agricultural career, just as did regions in the central part of North America. Railroads were built across the plain from Buenos Aires and Rosario, just as they were from Kansas City, Omaha, and Minneapolis. Immigrants from Spain and Italy came by thousands to cultivate the new fields. (Fig. 610.)

The land in Argentina is splendid for farming; it is rich, level, and so free from stones that you cannot in miles find one as big as an egg. Plows, reapers, and threshers were sent out from the United States, and the fields of wheat, corn, and flax increased. Sometimes there are droughts, sometimes too much rain. Sometimes the locusts (grasshoppers) fly down in millions from the forests to the northward and eat up the crops. Nevertheless this has become one of the great agricultural regions of the world. Argentina grows more flax for seed than any other country. Fleets of steamers sail from Europe to the river Plata, and return laden with wheat, corn, meat, and flax seed. Only a fraction of the Argentine land in this region is now under cultivation. The remainder is still in pasture, just as a smaller part of our own Corn Belt is in pasture.

827. The gentleman and the job.—

What is it that makes a man a gentleman? The Spanish settlers brought a wrong idea about that across the ocean with them, and Argentina, like the other countries settled by the Spaniards, suffers because of it. In the United States and Canada the people themselves built the railroads, managed the companies, and ran the industries. Because the Argentinians think that a gentleman ought not to work, the railroads and the trolley lines, the gas works and the elec-

tric light plants, and the biggest business enterprises are owned by the British, French, German, Dutch, and American companies that built them. Most of the skilled men, managers, and workmen, are northern Europeans, or Americans. But Argentina is beginning to get over her foolish idea about what makes a gentleman. She is beginning to be proud of being a modern nation.

828. The estate and the family.—In Kansas, Oklahoma, and other parts of the United States, and also in Canada, the land was given away to the early settlers in farms of 160 acres each, which the government wisely thought was enough to make a good home for a family. Our government wants every man to own the farm he cultivates and the house in which he lives, because it makes him a better citizen.

The kings of Spain liked to favor their friends by giving them land in the colonies. Sometimes a friend of the king would receive a grant of thousands and thousands of acres, as much as a whole county in the United States. The Argentine politicians have also given land away to their friends in much the same way as the kings did. The man who owns one of these huge estates (estancias) does not want to live on it nor does he work for the good of the neighborhood. He wants to live in some big city, and visit

Madrid and Paris. In every Spanish-speaking country there are big estates of this kind. Even California, New Mexico, and Texas have them. Why? In the splendid grain and grass lands of Argentina and Uruguay, many of these vast estates are owned by people who live in Buenos Aires or Montevideo, and who may not see their lands from one year's end to the next. Sometimes it takes the agent two or three days to drive over the estate and visit the various workmen's camps. Some of the agents are now planning to travel about over their ranches in airplanes.

In the grain districts, the land is rented to tenants, most of whom are Italians, who live in shacks, and who rent the land for a year or two and then move on to some other place. This custom is very bad for the country, because no settler stays long enough to help make a good neighborhood, and no one keeps up the schools or the roads. The roads are so bad that wagons often have wheels ten or twelve feet high in order that they may not stick in the mud. (Fig. 590.) Fifteen or twenty horses may have to be hitched to one wagon to haul the grain to market.

829. The meat industry.
—Since meat has gone up in price, the people of the Argentine no longer waste their good grass in raising bony cattle, from which they sell only hides and tallow. Instead, they raise fine herds of the best English breeds of big, fat sheep and cattle. (Figs. 594, 586.) Alfalfa, the best of all forage plants, grows in Argentina as well as it does in any part of the world; so northeastern Argentina and Uruguay have now become one of the great meat-producing regions of the world. Instead of being boiled down for tallow, the

cattle are sent to modern meat-packing houses built and operated by men from Chicago, and owned by European and North American capitalists. (Figs. 582, 583.)

Most of the meat animals go to the packing houses and freezing plants of Buenos Aires, Rosario, and Santa Fe, Argentina; to Paysandu, Uruguay; and even to Pelotas and other places in southern Brazil, for the meat industry has recently sprung up in this part of the temperate agricultural region also. Argentine meat had begun to come to New York before the World War; but during the war all of the meat was sent to Europe. Since the war we have been importing millions of pounds a year.

A Spanish company recently built meat-freezing plants in Buenos Aires and Santa Fe, cold-storage warehouses in Bilbao and other towns in Spain, and refrigerator ships to carry frozen meat to Europe. There are many such steamship lines from Plata ports to the ports of northwest Europe.

830. Forests.—As in our own country we have a great natural forest from Oklahoma to the Atlantic, except where man has cut it



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Fig. 592. A part of the Plaza or public square of Montevideo.



Finch & Baker, U. S. Dept. Agr.

Fig. 593. Grape acreage in southern South America. Why are they not grown more largely near the markets along the River Plata?

southern Brazil are many thousand square miles of splendid pines, much like those of our own southern states. These forests are a continuation of the forest mentioned in Section 821, and are the only important pine forests of the southern hemisphere. Some day, when railroads and sawmills have been built, these forests will give rise to a great industry. Lumber export to other parts of South America has already begun.

831. The Gran Chaco.—A large area in northern Argentina, west of the Parana, is called the Gran Chaco (Great Forest), although most of the high forest is only along the streams. There is so much good, open grassland farther south, in a cooler climate, that this section has been little used. Parts of it have scarcely been explored. In 1920 an American party went through some of it. They said it was like trying to go through a hedge endwise. The land was covered with a dense mass of thorny bushes about six feet high. You could only pass here and there by following paths made by deer and other animals. This land might be made to raise animals for meat, and to grow many of the crops of our southern states, such as corn, beans, peanuts, and cotton.

832. The cities of the coast.—Why might we say that Buenos Aires is both the Chicago and the New York of Argentina? (Secs. 321, 340.) Buenos Aires is still growing rapidly and is already a great city, almost as large as Philadelphia. It has splendid streets, beautiful houses, and great newspapers. The styles of Paris are copied by its people more quickly than they are copied in New York. Buenos Aires has many places of amusement, and is one of the gayest cities in the world.

In its harbor, Buenos Aires has better machinery for handling freight than has New York. Across the wide river is Montevideo, the capital of Uruguay, a finely-built city with three-fourths as many people as Washington, D. C. Southward from Buenos Aires is Bahia Blanca, a grain exporting port, the Galveston of the Argentine. Rosario, two hundred miles up the river Parana from Buenos Aires, is visited by ocean steamers, and has a population larger than Omaha. This city is much like Omaha in its business, except that ocean steamers can reach it.

833. A place for the immigrant.—The unused, or little used, lands of southern Brazil, Uruguay, and eastern Argentina comprise one of the four good, large regions waiting for the immigrant who wants to farm in the land of frost. Where are the other three? (Secs. 92, 630, 686.)

In the Argentine part of this great region is much land that is not yet cultivated, and some day the big estates will have to be turned into one-family farms. Farming has scarcely begun in Uruguay, a country that is still a great sheep pasture of rolling grassland. Most of southern Brazil and northern Argentina is still a great forest waiting to be cleared and put to work producing corn, legumes, meat, and cotton.

But settlers are now going to these empty lands. In this part of Brazil several colonies of German farmers settled years ago. The climate is so mild that the farmer does not need an expensive house or barn. He can live in a tent for months, and in five or six weeks after he reaches his land he can be

eating beans and other vegetables from his new garden. The Brazilian government wants immigrants, and will pay the carfare from the Brazilian port to a farm colony for any immigrant with a family. The government will also sell him sixty-two acres of land, and seeds and tools, and will give him eight years in which to pay for all this.

As many as ten thousand immigrants a week landed at Buenos Aires during a part of 1920. Already many hundred thousands of Italians and Spaniards have moved to Argentina, and more are going there. Of late the East Temperate Agricultural Region has been second only to the United States as a place to attract home-seekers. We may therefore expect this region to have more and more wheat, corn, and meat for the markets of Europe and the United States.

QUESTIONS

1. From what country might the vessel in the harbor at Rosario (Fig. 609) come? With what is it being loaded? For what port will it probably sail? What products may it bring on the return voyage? 2. Why are Uruguay and Argentina great sheep-raising countries? 3. Why are the boys pushing the sheeps' heads under the liquid? (Fig. 594) 4. How far might you see across the pampas? (Fig. 586.) Why is it a good cattle country? 5. What industry is taking the place

of cattle-raising? Why? 6. Make the following comparison of regions:

TOPIC.	MISSISSIPPI VALLEY.	PLATA VALLEY.	NEW ENGLAND COAST.
Location.....			
Surface.....			
Soil.....			
Climate.....			
Navigable Rivers.			
Crops.....			
Ease of Colonizing			

7. Where do you find the most railroad lines in South America? (Fig. 610.) Why? 8. For what port may the steamship shown in Fig. 582 be bound? What products does she carry? How are these products prepared so as to keep through the hot voyage? Where is the main office of this company? Why are not the cattle taken to America or Europe to be killed and prepared? 9. Would you like to live in Montevideo? (Fig. 592.) Why? 10. Can you give two reasons which have helped the growth of this city and Buenos Aires?

11. Compare a farm in this region with one in the Northern Piedmont Region. (Fig. 228.) 12. Show by use of following chart how this region is a good land for farms:

NATURAL FACTORS.	HOW THEY AFFECT THE FARMER.
Soil.....	
Surface.....	
Rainfall.....	
Temperature.....	
Pests.....	
Navigable rivers..	



Photo. Publishers' Photo Service, N. Y.

Fig. 594. Sheep-dipping on an Argentine ranch. This is very unpleasant, but tell how it is helpful to the sheep and to us. (Sec. 44.) Explain how the dipping of sheep is like the spraying of trees, or the fumigating of a room.

THE ARGENTINE SEMI-ARID REGION

834. A South American New Mexico and Arizona.—You remember (Sec. 102) that in the United States, to the west of the land of cotton, corn, and wheat, are the Great Plains, a land of little rain, few people, and large sheep and cattle ranches. South America also has such a region in Argentina, between the farming lands and the western mountains (the Andes), which wall it off from the Pacific. Much of this country is so much like our own western lands, shut off from the Pacific by the Rockies, that if a man from Arizona or New Mexico were dropped from a balloon, he might easily say he was at home; for he would see exactly the same varieties of cactus, the same bunch grass, the same wide-stretching, treeless plains, the same flocks of sheep and herds of cattle, the same simple house of the ranchman. The ranchman, however, would speak Spanish, and most of his workers would be Indians or half-breeds called *gauchos*, the Argentine word for cowboys.

835. Fruit-growing oases.—Near the foot of the Andes, snow-fed streams are used to irrigate large orchards in which peaches,

pears, plums, grapes, and other fruits are grown and shipped from Mendoza and San Juan to eastern markets. (Fig. 593.) Tell of something like this in Arizona.

836. Railroads.—Two or three railroads cross this plain to carry cattle, sheep, wool, and fruits to the markets of Buenos Aires and other eastern cities. (Fig. 610.) One railroad connects Buenos Aires with Santiago, the capital of Chile, and Valparaiso, its chief port. It was very difficult and expensive work to build this road, with its many tunnels, across the high Andes.

837. A South American Alberta.—The southern part of this semi-arid region is called Patagonia. Name a place in North America, the same distance from the equator and at the eastern base of the Rocky Mountains. (Fig. 94.) Only recently have white men had ranches in Patagonia. Many of the settlers in this new district are Englishmen and Scotchmen, who came over from the Falkland Islands to the east of Patagonia. Find places on the coast of Britain and of western North America that are the same distance as the Falkland Islands from the equator. Falkland, a British colony, has plenty of rain,

and, like the highlands of Scotland and Wales, is covered with grass. The one great business is sheep and wool, so that the young men of the Falkland Islands know the sheep business well, before they go over to settle the new ranch country at the foot of the Andes. The best known trade center for this district is Punta Arenas. Can you find another city as far south?

838. Future.—American oil searchers have found some oil fields in Patagonia. If the deposits are rich, tell what may happen. Will the future of this semi-arid region be like that of our own Great Plains? (Sec. 113.)



Fig. 595. Caracas. Why do you think it is called "Pearl of the Andes"?

QUESTIONS

1. Why are strong gales in the Falkland Islands common? 2. How would you like to have a job with an oil company digging wells in latitude 50° S. and longitude 70° W.? 3. How far is the region from New York? from Liverpool? 4. Why is it so sparsely settled? 5. Suppose you were to go by balloon into this region. What would you see? What things would you take with you? What would you do?

6. Compare the following transcontinental railway lines:

TOPIC.	TRANS-ANDEAN.	CANADIAN PACIFIC.	TRANS-SIBERIAN.
Cities joined			
Products carried:			
Eastward.....			
Westward.....			
Length			
Usefulness			

7. Compare a part of Alberta and Montana with the Argentine Semi-arid Region.

REGION.	LOCATION.	RAINFALL.	SURFACE.	PRODUCTS.
Alberta.....				
Argentine Semi-arid Region...				

THE ANDEAN REGIONS

839. A mountain world in three parts.—

The extreme northern end of South America is farther from the extreme southern end than Panama is from Greenland. At the southern tip is a high rocky cape; at the northern tip the mountains reach the sea; and between them is the great Andean mountain system which is a world by itself. This mountain world is high and cool, even where the hot tropic lowlands lie at its feet. Some of the world's highest volcanoes are Andean peaks, the smoking tops of which are covered with perpetual snow. Dust blown out from these volcanoes has made much rich valley land between the ranges. In 1921 volcanic dust fell so thickly that it buried a sawmill near Valdivia, Chile.

To understand the Andes at all, we must think of our own Rocky Mountains as having been raised to almost double their height, and as being without passes. From central Colombia to a point south of Santiago in Chile, not a single pass is less than 10,000 feet in height; that is nearly twice



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Fig. 596. La Guaira, Venezuela, as the incoming traveler sees it. How wide is the coastal plain here?

the height of any mountain east of the Mississippi River. Between latitudes 5° and 30° south, no pass is less than 15,000 feet in height. This means that for a distance greater than the extent north and south of the United States, there is a continuous mountain wall, higher than any peak in the Rockies.

This mountain world of South America has three different parts, each unlike the others. From Cape Horn to 30° south it is composed of mountain ranges, high and sharp like our own Rocky Mountains, but more lofty. Then comes the highest part of all, the wide, cold Andean plateau with snowpeaks above it. This division reaches from 30° south to a place a short distance north of Cuzco in Peru. Next to the cold Andean plateau come the mountains and plateaus of the northern Andes. These are not so high, so wide, or so cold as those of the central Andes.

PART I.—THE NORTHERN ANDES

840. Caracas—Pearl of the Andes.—The traveler going from New York to La Guaira sees the green forest-covered northern edge of the Andes towering in the air, long before he can make out the palm trees along the shore, or see the white houses of the little port that lies snuggled at the foot of the steep highland. The railroad from La Guaira, or



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Fig. 597. A steamer from the United States unloading goods from America on the quay at La Guaira.

from Puerto Cabello to Caracas, must wind around many more miles than do the wagon roads that go up to the plateau. (Fig. 572.)

Caracas was the capital of a Spanish province and the trade center for a wide region, long before it was the capital of Venezuela. When the traveler reaches Caracas and feels the refreshing coolness of the evening, he understands why the Spaniards climbed the high mountains and made their capital on this lofty plateau rather than on the hot coast plain. From a neighboring mountain, one can look down on the white walls, red roofs, and church steeples of the beautiful city that is spread out on a plateau. On all sides picturesque mountains surround it, and one understands why the Spanish called their capital the "Pearl of the Andes".

The Spanish-speaking people are well-dressed and polite, although many of

them show that they are part Indian. Only a few of them can read.

On market days the streets and the squares are filled with barefooted Indians wearing cheap cotton store clothes from the United States and Europe, and wide straw hats which they have plaited by hand. Hundreds of pack mules come over the trails from the little farms in the valleys and on the mountains, bringing produce to city markets to be exchanged for store goods. These Indians and half-breeds cultivate patches of corn, beans, cassava, coffee, fruits, and vegetables.

841. Home industries in the Andes.—The daily life and the food of the dwellers of the northern Andes are much like those of the people of the plateau of Mexico and the Central American Uplands (Secs. 147, 369), and even the people themselves are quite similar.

Mexico sells minerals from her mountain rocks, coffee from her mountainside farms, and the hides of cattle and goatskins. The people of the northern Andes have similar things to sell. Since it is hard to reach, the region can have but little trade. Only such valuable things as hides, wool, coffee, and precious metals can be carried on muleback down the long mountain trails. As in other regions where machines are very few, most of the needful things must be made at home.



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Fig. 598. Market day at a town near La Paz, Bolivia. The poncho, a blanket with a hole for the head, is an almost universal Andean garment, serving for coat, overcoat, raincoat, shirt, bedclothes, and other uses.

From the wool of their own sheep, many of the natives spin and weave the blankets that serve as coats by day and as bedding by night. The houses, which are built of stones and mud, have grass roofs and earthen floors. Often there is not a single nail used in making the house. The people produce their food, which is chiefly corn, beans, vegetables, and meat. Their plow is still a crude wooden pole, drawn by oxen to whose horns the pole is tied with rawhide thongs.

The mountains make this region so hard to reach that in all its great length there are but few routes to the outside world.

842. Venezuelan routes to the plateau.—The Venezuelan part of the plateau, which was described in the last section, has the best chance for trade because the plateau is lowest there, and because this section reaches the coast.

The produce of western Venezuela in the region of Merida goes down by mule and rail to the shore of Lake Maracaibo. The lake is really an arm of the sea, whence coasting steamers take freight around to La Guaira, and to Curaçao, a little island owned by the Dutch and visited by many steamers.

843. Colombian routes into the northern Andes.—As in Venezuela, most of the people in Colombia live on the highlands. It is



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Fig. 600. An Ecuadorian half-breed weaving a hammock in front of his hut. The boy is making a rope. Make a list of the things you can see in this picture.

much harder to reach these highlands than those of Venezuela. If a traveler wants to go to Bogota, the capital of Colombia, he must go by steamer to Cartagena or Puerto Colombia; then go by railroad across to the Magdalena River; then by river steamer to La Dorada, 617 miles from Puerto Colombia; then seventy-two miles by railroad around a series of rapids; then fifty-eight miles more by another steamboat to Girardot. The journey thus far takes about a week. From Girardot a railroad, with rails only three feet apart, climbs up to Factativa, which is on the edge of the plateau, 9990 feet in altitude. It takes eight hours to travel over the twenty-five miles between these cities. At Factativa one must change to another railroad whose rails are only thirty-nine inches apart. Soon the train reaches Bogota, 8600 feet above the sea, and with snow peaks in sight. After traveling for days in the wilderness, a fine city like Bogota surprises one greatly. It is as large as Des Moines, Iowa, with a cool, bracing climate. It has Paris styles, electric lights, trolleys, and beautiful parks, and claims to be the literary center of South America. The national library here has over one hundred thousand volumes.



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Fig. 599. This copper smelter at Cerro de Pasco, Peru, shows what great works it takes to get the metal from the rock. How does one reach Cerro de Pasco? What people own this smelter? (Sec. 846.)



Photo. Wm. Thompson

Fig. 601. Indians of the Peruvian Andes standing before their home with its sun-dried-brick wall, grass roof and dirt floor. Where do you think the striped blanket shawl was made?

On the plateau west of the Magdalena valley is Medellin. This old city is nearly a mile above the sea, but for three hundred years people and freight have taken a two days' trip by mule up and down the mountains to the boat landings on the Magdalena.

844. Freight and gold.—How costly it is to send freight by such routes! Clearly the things sent out must be of great value. Gold, in which the Medellin district is rich, is its chief export. The thousands of gold diggers can get no machinery except that which they themselves make, or bring in in pieces on the backs of mules.

845. Up to Quito.—Quito used to be as hard to reach as Bogota, but the trip by the new railroad from Guayaquil now takes only two days.

Quito boasts a climate of eternal spring. The city is only fourteen miles from the equator; but as it is nearly ten thousand feet above the sea, the thermometer goes down to 50° every night. By day the sun shines bright and warm. One month is no warmer or cooler than another; so the farmer plants his crop whenever he wishes.

846. The Cerro de Pasco route.—The fourth important railroad into the northern Andes starts from Callao and goes through Lima, the capital of Peru, a city perched upon the dry foothills. Up, up, up, higher than the top of any mountain in the United States, goes the railroad. It then goes along

the plateau to the famous mining town of Cerro de Pasco, 14,280 feet above the sea. It was at this place that, in 1630, an Indian shepherd happened to spy a lump of silver in the ashes of his campfire. He began to dig the precious metal. Other Indians came and a city grew. Engineers now know that there are two thousand veins of ore containing copper, gold, and silver. Men have dug here for nearly three centuries, but there is still an immense amount of ore in the ground. An American company has great smelters and employs thousands of Indian workmen. (Fig. 599.) The best machinery is used, because the railroad can bring it in.

847. The Indian's pack train.—In Cerro de Pasco, as at Quito, Bogota, Caracas, and many smaller places, one sees the plateau Indian with his llamas or his pack mules. The animals are burdened with wool, sheepskins, cowhides, valuable ores, and even with rubber, secured in trade from some lowland tribe to the eastward. This Indian may have come two hundred miles, sleeping at night by the campfire. The Indians hobble their beasts, by tying their feet with a soft rope of llama wool so they can only walk a little. The animals then pick their living by browsing wayside herbage. After an absence of weeks or even of months, the Indian gets back to his distant village with a year's supply of white men's factory-made goods.

QUESTIONS

1. In what countries is the Northern Andean Region? If we could place the southern end of this section at southern Florida, where would the northern end be?
2. How would you travel from your home to Caracas? Bogota? Quito? Cerro de Pasco?
3. Why are these cities of the northern Andean countries located in the mountains?
4. Name the products of this mountain area. Name the chief exports.
5. Name two ports of each country in this region.
6. What is the population of each country?
7. Why is there more difference in temperature at Quito between noon and midnight than between January and July?
8. What determines the temperature of a city like Quito?
9. Colombia has some coal. It has oil, and Venezuela has iron. Does the presence of these two resources mean that these countries will have more population than Argentina, which is without coal or iron?
10. Which of these three countries is best fitted by nature to become a leader?

PART II.—THE PLATEAU OF THE CENTRAL ANDES

848. A land of ancient empire.—When the conquering Spaniards climbed the Andes, they found the city of Cuzco, the ancient capital of a populous Indian empire that had long been ruled by the Inca kings. In the Inca empire there were splendid roads, running for hundreds of miles across the plateaus and along the sides of the mountains. The industrious people had built large buildings with stone walls of astonishing workmanship. (Fig. 602.) As there were many people to feed, terraced and irrigated farms stretched one above the other to dizzy heights on mountainsides, and every possible patch of land was cultivated. The empire reached down to the seashore, and the laws protected the guano-producing waterfowl that had their colonies on the desert islands near the Pacific coast. (Fig. 560.) The laws of the Incas, if gathered together, would fill many books, for the ruling race was a highly civilized people.

The Spaniards conquered the Incas and robbed them of their wealth. The conquerors carried off bars of gold and silver that were worth seventeen millions of dollars. That was the largest amount of money ever seen in the world up to that time. More adventurers came from Spain, enslaved the plateau peoples, and made them dig the gold and silver out of their own mines. It was the cruel treatment of the Spanish taskmaster that so reduced the people that there were but five millions in 1920, where there had been fifteen millions in 1530.

849. A wide plateau and four-step farms.—How wide is the plateau between the high ranges of the eastern and western Andes in Peru? On the edges of this plateau the rivers have cut deep valleys, some of which have

wide, flat bottoms with alluvial fans (Fig. 183) reaching out into them. Some farmers have developed three-step, or even four-step farms in this land of plateau, high mountain, and deep valley. "On an alluvial fan in the main valley they raise sugar cane and tropical and sub-tropical fruits; on the flat upper slopes they produce corn; in the moister soil near the edge of the woodland are fields of mountain potatoes; and the upper plateau pastures maintain flocks of sheep. In one district this change takes place in a distance that may be covered in five hours. Generally it is at least a full and hard day's journey from one end of the series to the other."*

850. High plateau climate and life on the high plateau.—This plateau is not a pleasant place in which to live, because it has such a very high elevation. La Paz is 12,000 feet above the sea, and Potosi is 13,000 feet. There is less air on this plateau than in our country, for one-third of the earth's air lies below 10,000 feet, and the air above that level is so thin that it is hard to breathe it.

The traveler from Europe or America, who

* I. Bowman in J. Brunhes' *Human Geography*.



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Fig. 602. Some of the remarkable masonry built by the Incas in the Peruvian Andes before the coming of Columbus.

goes to these mountain places, nearly always has *soroche*, or mountain sickness. His head thumps, he becomes dizzy, and he suffers in many ways. Potosi is so high that two-thirds of all the white children born there die within a few hours.

The plateau is very dry, because so little rain falls inside the high walls of the Andes. The air cools off very quickly, because it is dry as well as thin. As on the tops of high mountains, the sun on this plateau burns you by day like tropic heat; by night the high, thin air cools off so quickly that you think you are in the Arctic.

851. The plateau farmers and shepherds.—Most of the plateau is so dry that it produces little but scanty pasture; it is so cold that the wind bites you almost to the bone. It is scantily peopled by shepherds, except near mines and irrigated spots. The Indian shepherd lets no grass escape him. An American geographer, Dr. Bowman, says: "It is a constant marvel to one in the mountains to see to what altitudes the shepherd climbs and what out-of-the-way places he reaches. He is the characteristic element in the Andean scene—bleak slopes in some high valley, a widely scattered flock of llamas, a solitary shepherd whistling and clucking to his vagrant flock, turning them to right or left by throwing stones, and industriously spinning the llama wool into yarn as he trots along, often without food save the leaves of the coca, and without water for a day or more at a time, far from any shelter, alone. He is an excellent guide, fearless and confident, with knowledge of every spring and trail and no special concern for ordinary altitudes below the snow line."

852. Crop zones on mountain slopes.—The central Andes show us how elevation decides the use that man can make of land. Most of the area is so dry that crops can be grown only where some stream, flowing down from a snowfield, supplies water for irrigation. In most places water is to be had only on alluvial fans. Below 6000 feet elevation, cassava is the chief crop. From 6000 to 10,000 feet is the zone of corn.

Wheat is grown from 10,000 to 12,000 feet. The potato begins at 11,000 feet in the moister spots, and barley begins at the same elevation in the drier spots. Beyond these come the sheep and llama pastures, which extend right up to the snow line. Near Antabamba, Peru, at the elevation of 17,100 feet, higher than any summit in the Rockies, is a stone hut with a grass roof, the highest known human habitation in the new world.

Wherever in the plateau there is a warm valley, there the people have their villages. On the bleak plateau itself there is not a house for miles and miles around. In the villages the rich people live in the lower and warmer parts of the valley. The houses of the poorer people are higher up in the greater cold.

853. The railroads and the mines.—The western front of the Central Andes does not seem like a mountain. Steep, treeless, and bare, it seems more like a great wall of masonry than like a mountain. (Fig. 599.) But the white man, to get the precious gold, silver, copper, and tin, has built three railroads up this wall to the mines on the high plateau. From what ports do the railroads go? On top of this plateau, at an elevation higher than that of any town of the United States, is Lake Titicaca, on which are steamboats that were brought there in pieces and put together at the little town of Puno on the western shore of the lake.

854. Precious metals have been the chief export of this region for the last four hundred years. The great mountain of Potosi alone has produced, in that time, \$1,500,000,000 worth of silver. In the mine there are five thousand tunnels. Since railroads have been built to the plateau, European and American companies are working the old mines with modern machinery.

Tin from near Lake Titicaca is the chief export of Bolivia. At present, Europeans and Americans plan and manage the mines, but most of the work is done by the natives.

La Paz, the capital of Bolivia, is a mining center in a place where food is scarce. Every day hundreds of mule trains toil over the

bare plateau, bringing potatoes and barley. Other pack trains bring bananas and fresh vegetables up the long stony trails, from the warmer valleys and from the edge of the grasslands to the eastward. (Sec. 811.) All of this transport by mule train is necessary, because a hundred thousand people live in La Paz, and it is a very long way to any good food supply by way of the railroads to the Pacific Coast. (Sec. 846.)

QUESTIONS

1. What countries are within the region? 2. The plateau of Bolivia best illustrates this region. Bolivia is the most backward country in South America. Let us see why: (a) What is the elevation of the plateau? (b) What kind of weather will you find at such altitudes? Why? (c) How much rainfall is there? What crops are raised? (d) Trace the railroad from the coast to La Paz. Would freight rates on such a road be very high? What kind of products only could be carried? What other method is there of reaching the coast from La Paz? Does the region mine coal? Why is mining difficult in Bolivia?

3. What interesting facts can you tell about Lake Titicaca? 4. Why is Bolivia's tin important? What other countries that you have studied export it? What countries do not use it? 5. Do the natives in Figs. 598 and 601 look prosperous? Why were the Indians so prosperous five hundred years ago, but so miserable to-day? The Incas were not prepared for warfare when the Spanish conquerors came. Why?

6. Give several reasons why you would like to visit La Paz. 7. Under the following heads compare life here with life in the Alps: Elevation; Occupations of people; Travel facilities.

PART III.—THE SOUTHERN ANDES

855. A very long, narrow region.—Look at your map of North America and locate a western coast lying between 30° and 55° from the equator. In the corresponding part of South America the Andes (Fig. 566, F 3) are steep, high mountains with no plateaus, and the few valleys are only narrow canyons. What is the highest peak? Only in the south, beyond latitude 40° , do we find valleys wide enough to hold forests, or a region that can be of any important use to man, save as a source of snow water. This section has almost no people, as we have seen (Sec. 837).

856. Future of Andean regions.—Some day there should be more railroads to the Andean plateaus and mountains. There may then be better animals eating the grass, and

more machinery, and more American mining engineers to help the Indians and Spaniards dig the valuable minerals out of the mountains. Perhaps the greatest difficulty is the poor government, which results from attempts to have a republic in a land where most of the people are illiterate Indians.

QUESTIONS

1. What countries are partly included in this region? 2. What do you think of the possibility of developing power by the use of windmills in this area? For what could the power be used?

THE PACIFIC COAST DISTRICTS.

857. A place of sharp contrasts.—South of the Gulf of Guayaquil, the long strip of land between the Pacific and the Andes has three very different climates. One might almost say it is composed of three different little worlds. Down to about 30° south, the southeast trade wind blows from the coast, when it blows at all. The high Andes keep the trade-wind moisture on their eastern slopes. The Pacific shore is therefore a trade-wind desert two thousand miles long. South of latitude 30° , the wind blows from the west, and the rainfall increases as one goes southward, entering first a subtropic region, like California and Spain, and then a cool, temperate region, like Washington, British Columbia, and England.

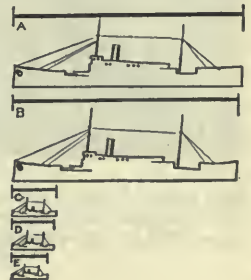
PART I.—PACIFIC COAST DESERT

858. A bare brown land with irrigated oases.—In the Peruvian part of the coast desert the Andes have more snow than farther south. In summer the snow melts and makes the short rivers rush in roaring torrents down to the Pacific. Therefore there are oases in this coast desert. Lima, the capital of Peru, with almost no rain at all,

Fig. 603. Five leading importers of nitrate of soda (1913):

	Thousand tons
A. Germany.....	680
B. United States.....	589
C. Belgium.....	130
D. France.....	125
E. Holland.....	105

Why is the United Kingdom not in this? (Secs. 418, 425, 439.)



has a fine supply of snow water, and also a good food supply. The food comes up from farms that are irrigated by the little snow-fed river that rushes through the city.

The traveler going along a thousand miles of this coast sees the bare, brown desert, then green fields along some stream, then more desert, and then more green fields. The irrigated oases support one-third of the native people of Peru and nearly all of the white inhabitants. The farms grow bananas, vegetables, corn, and alfalfa for home use. They export cane sugar and Peruvian cotton, a kind having a long, brown fiber, which is excellent for mixing with wool.

859. The richest of deserts.—Back of the Chilean desert, the Andean wall is less broken than elsewhere, and the plateau is wider. There is so little snow upon the high mountains that the streams coming down the west side are too small to reach the ocean between Arica and Caldera. How far is it? At best they can only feed little oases at the foot of the mountain wall, fifty or a hundred miles from the dry, desolate coast.

In this desert, years sometimes pass without the appearance of a cloud in the sky.

Some of the people who live there have never seen rain. Yet these deserts, that lie from three thousand to five thousand feet above the sea, give Chile a rich, foreign trade, because a long sheet of salt and nitrate of soda several inches thick covers the ground. There fifty thousand men, living in shacks of corrugated metal, dig up nitrate and work in the refineries. Almost every fertilizer factory, every powder factory, and most of the chemical plants of Europe and America use this nitrate of soda. Hundreds of ships go for nitrate to Iquique, to Antofagasta, and to the smaller ports. These desolate, treeless cities on the desert obtain water by pipe lines from the foot of the Andes. Every bite of food the people and their animals eat comes from the farms in the rainy lands to the southward, and is carried to them in ships. Nitrate, like salt, would dissolve in rain.

Near the nitrate works are many copper mines and rich deposits of iron ore. One of the iron mines belongs to an American company, which has built a railroad, a dock, and a steamship line to carry ore to Baltimore and Philadelphia. Some of the iron mines are owned by Japanese business men.

The copper, the iron, and the nitrate of the desert comprise nearly all of the Chilean exports (Fig. 603), and pay most of the taxes as well, for everybody who buys nitrate must pay an export tax to the Chilean government.

PART II.—THE CALIFORNIAN-MEDITERRANEAN REGION OF CHILE

860. A good rich land.—This region lies between 30° and 42° south. Where, on the coast of North America, would be a region equally far from the equator? Like California (Sec. 182), this part of Chile has winter rain and summer drought. So have Spain and Italy. All the tropical and sub-tropical products that grow in Spain and California can also be grown in this South American California. Also, Chile is like California in having a great interior valley that lies between low coast ranges and a higher inland mountain mass. Most of the people of Chile



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Fig. 604. A fruit vendor in a nitrate town. Why is there no grass in the square? Where did the fruit grow? (Sec. 859.) In what month was the picture taken? (Sec. 863.)

live there, because the climate is delightful and the people can raise many good food crops. A railroad extends the entire length of this valley. It has several branches to the small ports, and from these places ships carry food to the desert ports on the nitrate coast.

This part of Chile has about as many people as California. As in California, you can look out across the fertile valley and see to the eastward the snowcapped mountains, from which comes water for irrigation and for water power. Now that coal is so high in price, the Chileans are doing as the people of California have done—they are using mountain waterfalls to produce electricity with which to run their factories, street cars, and electric lights.

In Chile, as in California, the climate is healthful. The people are energetic. They,



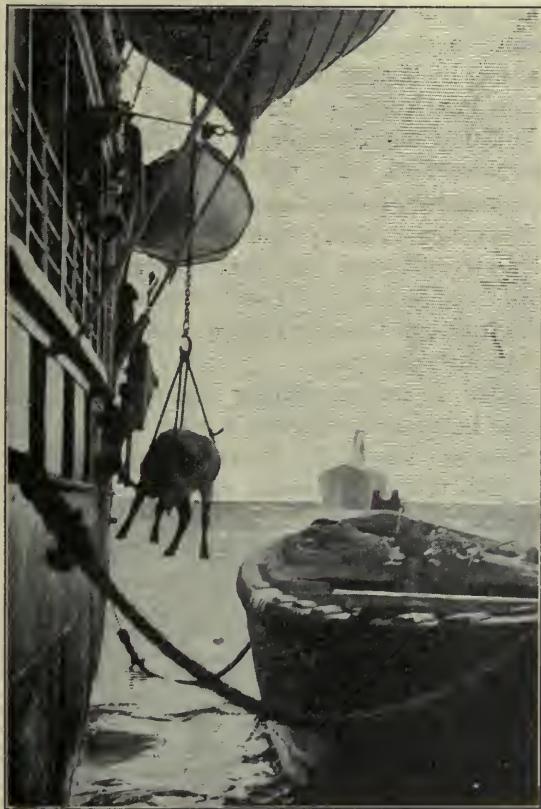
Fig. 606. Map showing where Chile would be if each part of it had the same latitude in North America that it has in South America. Can you point out the part of Chile having most of the farming?

and the Argentinians, are the most progressive people of South America. The Chileans have one of the best governments on that continent. They call themselves the "Yankees of South America," and pride themselves on having good schools. The chief center of population is near Santiago, the capital, and Valparaiso, the chief port. Farther south, near Valdivia, there are large settlements of Germans, and many Indians of a strong, proud race, who are called Araucanians.

PART III.—THE PUGET SOUND-ENGLISH CHANNEL SECTION OF CHILE

861. A windy coast with much rain.—

South of 42° , the Chilean coast is steep like the coasts of British Columbia, Alaska, and Norway. It is in the part of the southern world where the wind blows almost always from the west. For a long time the area in the southern seas where the prevailing west winds blow has been called the "roaring forties". Because the wind blows so hard, trees cannot grow on the Falkland Islands (Sec. 837). The experience of a sailing vessel in the year 1919 shows the great force and regularity of these winds. The boat was bound from Melbourne, Australia, to Bunbury, West Australia, but the westerly wind blew so strongly that to save time the captain turned his ship eastward and went almost around the world (14,500 miles in this latitude) in seventy-six days, averaging 292



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Fig. 605. Wharves are scarce on the almost harborless west coast of South America. Can freight be unloaded when the water is rough and the boat rocking?

miles a day, when really he wanted to go only about 1000 miles to the westward from the starting point.

On this southern coast of Chile we have the record of a terrible rain, lasting for 131 days, while the wet west wind blew out of the Pacific against the steep shores without ceasing. It is not surprising that few people live in such a place, where the land is covered with dripping evergreen forests. Within the mountains are drier valleys, but thus far this Chilean region has been but little used.

To see how completely climates can differ in places a short distance apart, look at the two ends of the Straits of Magellan. The west end is gloomy with fog and cloud, rain, snow squalls, and a wet forest. The east end is a flat, sunny, grass-covered plain. Why the difference? (Fig. 157.)

862. Future.—If reservoirs are built in the mountains, as we have built them in our own Southwest, the coast section of Peru may have a little more of its land irrigated. Except for the possibility of sun power (Sec. 142), the Chilean part of the desert has no future except to work out the mines, after which the people will move away. This may not happen for several generations.

The forests in the south may some day furnish a lumber industry, but at the present time the people of all this Pacific coast are



Photo Underwood & Underwood, N. Y.

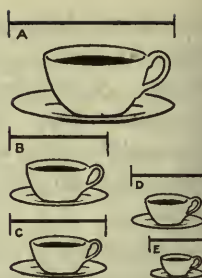
Fig. 607. Planting sugar (pieces of cane) in one of the irrigated sections of Peru.

Fig. 608. Five leading Cocoa producing nations. (1917)

Pounds

A. British colonies	320,020,000
B. Brazil	121,253,000
C. Ecuador	88,184,000
D. St. Thomas . .	67,999,000
E. San Domingo	54,674,000

A short time ago Ecuador led in cocoa. Why has the Gold Coast yield increased? (Sec. 737.)



bringing much of their lumber from the mountains of California, Oregon, and Washington.

863. A spring fruit supply for us.—It is the Californian-Mediterranean part of this coast region that has the enduring future, because it has resources similar to those of California. Much of the land is still uncultivated, and when it is all in use it may support several times as many people as it now does. This region has the chance to build up a great trade by sending us fresh fruits in the springtime. (Sec. 768.) How far is it by boat to New York from Valparaiso? from Los Angeles? In late April, 1921, the Chilean Commissioner of Agriculture came to New York with the first trial shipment. His peaches, melons, apples, and grapes were of excellent quality and in good condition. The freight was less than railroad freight from California, and the Commissioner says the fruit can be grown more cheaply in Chile than in California.

864. A manufacturing region may arise here, because the climate is good for men, and the waterfalls of the Andes can be made to furnish power. Foreign capitalists have already built large factories near Santiago.

QUESTIONS

1. Locate Lima. What is its population? How much rain has it? 2. How does such a barren coast raise food for so large a city? (Fig. 607.) 3. If the north Chilean coast became rainy would you find nitrate deposits? Explain. 4. The Californian-Mediterranean Region of South America is one of the world's rich spots. Let us see why: (a) What have you learned about its climate? (b) Is the soil rich? Why? (c) Is the surface of the valley portion good for farms? (d) Where do you find forests? (e) How might the people develop water power to run their factories? (f) What energetic people have migrated into this country? 5. An island near the west end of the

Straits of Magellan is called Desolation Island. Why might this be a very appropriate name?

6. Why is part of this coast a desert? 7. In damp sand, model central Chile. Show the Andes, the Great Central Valley, and the Coast Range. In some suggestive way indicate the products, important cities and railroads. 8. Compare southern Chile with the land near Puget Sound:

REGION.	LOCATION.	WIND DIRECTION.	RAIN-FALL.	TEMP.	PROD-UCTS.	CITIES.
Southern Chile.						
Puget Sound..						

9. How would you infer from Figs. 605 and 612 that Chile had poor harbors? 10. Write a brief comparison between Chile and the Pacific Coast Districts of the United States. Use Fig. 606 for a guide. 11. Complete the following chart. Call it "How I Remember the Pacific Coast Districts of South America."

NAME.	EXTENT: FROM TO	CLIMATE.	PROD-UCTS.	CHIEF CITIES.	WHERE I WOULD RATHER LIVE.

12. Name products each of the Pacific Coast districts must import. What things do they have to sell to you and to me?

THE TRADE OF SOUTH AMERICA

865. Trade in spots.—The railroad map of South America (Fig. 610) shows that only a small part of South America can have



Photo. Brown Bros., N. Y.

Fig. 609. Sacks of wheat sliding down a board from a warehouse to a ship at Rosario.



Fig. 610. Does this map prove the statement that South America has trade in spots?

much foreign trade. Argentina, with its flat pampas, is able to build railroads cheaply, and a net of steel tracks spreads out from Buenos Aires. Rio de Janeiro and Santos are the points of departure for another web of railways, but elsewhere railroads are few. This map shows us that this continent, with its land little used, waits for settlement. Indeed it might still be called the continent of the pack mule, because so little of the surface is reached by any other means of transportation. The old city of Cartagena, Colombia, a great fortress before Virginia and Massachusetts were settled, has to this day but one automobile road to the interior, and that is only sixteen miles long.

Nearly all the South American countries border upon the sea, and many of the important cities of the continent are seaports. These ports are gateways through which the traveler can start for the vast interior, and through which the products of interior regions are sent to the outer world.



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Fig. 611. Boats and stern-wheel steamer on the lower Magdalena River.

866. Four sets of steamer routes.—The ocean is the great South American highway, both for the foreign trade and for the trade of the South American countries with one another. Four different sets of steamers, sailing over four different sets of routes, carry the trade of South America. To the north coast, one set of steamers goes from England, France, Holland, and the United States. From New York to Colombia and Venezuela is only a week's sail.

A second set of routes leads from New York and Liverpool to the mouth of the Amazon, from which point steamers ascend to Manaos, a thousand miles upstream, and some even to Iquitos near the foot of the Andes.

The third set of steamer routes from America and Europe goes to the east coast, calling at Bahia, Pernambuco, Rio de Janeiro, and Santos, and at Buenos Aires, the greatest port of them all. At these great ports the ocean steamers take on the produce which small coasting steamers have brought from many little ports. The heaviest freight to these coast ports is coal, of which these countries, unfortunately, have almost none.

The fourth set of routes leads from the North Atlantic to the west coast of South America. The steamers on these routes formerly had to thread their way for 300 miles through the crooked, rocky, foggy, snowy Straits of Magellan. It was a terrible journey to go through these straits, which are called "The Ships' Graveyard". It has

been estimated that one vessel out of every ten which regularly pass through the Straits of Magellan becomes lost or disabled. The opening of the Panama Canal in 1914 was a wonderful help to trade. By this route New York and Valparaiso, Chile, are only 4625 miles apart. By way of the straits, they were 8380 miles apart.

The west coast is for the most part high and rocky, with few harbors. Even at Mollendo and at Valparaiso, passengers are let over the sides of ships in baskets, and like the freight are lowered into small boats. If a stiff wind blows, the vessels cannot unload. This use of small boats, or of barges called lighters, is a very poor and vexatious manner of handling passengers and goods. Few of the ports of South America have really good harbors. Many ports have only a "roadstead," that is, a shallow open bay where ships may anchor, sometimes a mile from shore. Goods must be packed very securely to endure the battering which they receive.

867. Development of resources by foreign capital.—The next industries to grow in this almost empty continent of South America will be more farms, more plantations, and more mines. Many of these things will be owned by people in the United States and Europe, as many of the Argentine railroads are now owned by English people, and as some of the Chilean iron mines and nitrate works are owned by Americans. When

English people own railroads or ranches and Americans own mines or other property in South America, the profits of the enterprise go to the owners in England or America. That is one of the reasons why old England and New England can support so many people.

Americans are helping to develop South America by engineering. Our civil engineers have constructed many docks, warehouses, and railroads for the continent. The most wonderful mountain railroads in South America were built by Americans.

One of these roads, from Lima, crosses the Andes at 15,665 ft., a greater elevation than the top of any mountain in the Alps or in the United States. The road climbs to the top of cliffs by corkscrew tunnels which wind around and around in the mountains.

Scores of Americans are hunting for oil every day in many parts of South America. If they find it, wells will be sunk and the oil will be shipped by companies formed with English and American capital. Some people think that the plains at the eastern base of the Andes, almost anywhere between Colombia and Patagonia, may some day prove to be great oil fields.

868. A continent with raw materials.—While there is some manufacturing of cloth, clothes, and many simple products at Rio de Janeiro, Sao Paulo, Buenos Aires, and other cities, South America manufactures but few of the things she uses. The South American stores sell hundreds and thousands of manufactured things that are not made in that continent. The people of South America would suffer greatly if they had no trade with any other continent, and the United States and Europe would also suffer if trade with South America were cut off. In the latter case, if South American trade with other continents should be cut off, the differ-



Fig. 612. Bales of wool going out to the steamer at Arica. (Sec. 866.) Where did that wool grow? Does the picture tell anything of the climate?

ent countries of South America could not help one another much, because no one of them has much to sell except raw materials. The most important trade between the countries of South America is that of the wheat and flour that are shipped from the cool countries to the tropical countries which do not grow wheat.

QUESTIONS

1. Name all the countries of both Americas. 2. Name the six Pacific ports from which railroads go up the Andes. 3. Show the value of the Panama Canal to western South America, by tracing the old and new routes between the places in the chart.

PORT.	TO NEW YORK VIA	TO NEW ORLEANS VIA	TO LIVERPOOL VIA
Guayaquil..			
Iquique....			

4. You are an automobile salesman from Detroit. To what parts of South America would you go to sell cars? Why? 5. Tell all the different ways in which people in the United States and Europe might suffer if South American trade were suddenly stopped. What must happen in South America before she can buy large quantities of goods from the United States? Can she buy without selling? 6. Model in damp sand the continent of South America. Think of ingenious ways to show the important features.

7. Fill out the following chart for South America:

REGIONS.	CHIEF PORT CITY.	EXPORTS.	DESTINA- TION.	IMPORTS.	SOURCE.

8. Arrange a tableau with characters to represent some of the regions of South America.



Courtesy U. S. Dept. Agr.

Fig. 613. A flock of New South Wales merino sheep pasturing on salt bush, a forage plant of the arid land. Why does this section grow wool sheep rather than mutton sheep?

AUSTRALIA AND THE PACIFIC ISLES

INTRODUCTION

869. The water hemisphere and the land hemisphere.—Imagine that man could dig a tunnel straight through the earth, and that he started digging at London. Find on the world map the place where the other end of the tunnel would be. It is at 180° east longitude and $51\frac{1}{2}^\circ$ south latitude (Fig. 10). Find the place that is on the other side of the earth from Pittsburgh (longitude 100° east and latitude 41° south); the place that is opposite Cape Town (34° north and 162° west). Notice that these three places are in the sea where the ocean is very wide and where there is but little land. Look at the map of the Pacific Ocean (Fig. 10) and see how many Australias you think it would hold. If you will remember that Australia is about the size of the United States, you will then begin to see that the Pacific is indeed a very large ocean—almost a world of waters.

If you should go as far south of the equator as Paris is north of the equator, you would be at a point from which a ship could sail

east or west in a straight line entirely around the world except for one bit of land. What land is it? In degrees of longitude? What part of the distance around the world is this? If the ship should go as far south of the equator as northern Scotland (Fig. 323) is north of the equator, what land would it touch in sailing around the world? Compare the amount of land in the southern hemisphere with that in the northern hemisphere. New Zealand is an island not unlike Great Britain. Compare the chances of the two islands for becoming great trade centers.

870. Scattered isles and a lonely continent.—The great Pacific makes up the larger part of the water hemisphere. Its surface is greater than that of all the land in the world. In all this wide sea there are only a few thousand square miles of land, made up of many small scattered islands. We shall study these islands, beginning with Sec. 902.

871. Australia.—Between the Pacific and Indian oceans is Australia, an island so large that it is often called a continent. Australia,

New Zealand, and the islands near them are often called Australasia.

Australia was once connected with Asia, but the sea separated her from other lands so long ago, and she was so far away from them that her animals and plants differ greatly from those of other continents. The large animals of Europe, Asia, and Africa had no chance to reach her shores. Thus the wild animals of Australia are most of them curious creatures of types not found in other lands. The commonest large animal is the kangaroo, whose babies are so small and helpless when born that the mother has a pouch in which she carries them. Perhaps the queerest animal of all in this region is one called the platypus, or duckbill. This strange creature is about the size of a large cat. It is covered with fur; yet it has a duck's bill and webbed feet. It burrows in the ground, lays eggs, and hatches them as the hen does.

Many Australian plants are of varieties not found in other places.

Even man, the greatest of travelers, seems almost to have missed Australia. When the white man went there a few generations ago he found a scanty, scattered population of chocolate brown, almost black, people, whose hair was wavy. Separated from the rest of the race by thousands of miles of space, they are often spoken of as a living fragment of the childhood of the human race. They are the



Photo. Brown Bros., N. Y.

Fig. 615. Solomon Islanders (black men) in their outrigger canoe, a boat that does not upset, and which is much used in Polynesia. Perhaps you can make a model of an outrigger canoe.

most ignorant, least civilized people anywhere on the globe. Many of them cannot be taught to count beyond eight. When discovered by the white man they had no roads, no farms, no good houses. They moved about from place to place, eating wild fruits, catching wild animals, and digging for grubs. Strange to say, the people did not live, as most primitive people do, in tribes, but each family lived by itself most of the time. When the children and grandchildren became too numerous for the food supply, the family would split up into smaller groups.

872. Australia, a new Britain.—To the European peoples Australia is the newest of continents. Long after North America was settled, an English sailor, Captain Cook, took possession of Australia, and in 1788, about the time George Washington became our president, the English made a settlement near Sydney. It was called Botany Bay, and was a settlement composed of convicts. This place was picked out because it was thought to be almost like burying a man to take him there. To this day it is not polite in Australia to ask a person anything about his ancestors, because perhaps they may have been settlers at Botany Bay.

When free settlers began going to Australia and New Zealand, nearly all of them were English, Scotch, and Irish. These English-



Photo. Brown Bros., N. Y.

Fig. 614. The family of a Samoan chief (brown people), their grass house and native costume.



Photo. Wm. Thompson

Fig. 616. A native Maori with a robe of grass-cloth, sitting in a doorway carved by a native. (Sec. 896.)

speaking people have mingled there into one race which is neither English, Scotch, nor Irish, but boasts that it is more British than any other people in the world. The Australians and New Zealanders are proud to call the United Kingdom their mother country, and most of their trade is with her. The armies of Australia and New Zealand went to France during the World War, and, in proportion to their numbers, they bore almost as much of the burden as the British armies bore.

In Australia the white man pushed the ignorant black man back to the interior, just as the Indians were pushed back in America. The Australians never brought slaves to their continent, as white men did in the United States and in South America. They are very anxious to keep their land a British land; so they allow none but white immigrants to come.

Before 1901, the government at London sent governors to New Zealand, Tasmania, and each of the five Australian colonies, as the governors were sent to our own thirteen colonies before the Revolutionary War.

In 1901 Tasmania and the Australian colonies united to form the Commonwealth of Australia. They now have a national parliament and a British governor-general at Melbourne, the temporary capital. At Canberra, in the highland of New South Wales, the people have set apart a district like our District of Columbia, to which the capital will sometime be moved. But time is required in which to build a city, and Canberra is now little more than a camp.

873. Australia, a partly settled continent.—Look at the population map, Fig. 624, and you will see that most of Australia is almost unsettled. Why have the energetic white men done so little in Australia? In North America they have settled the entire central part of the continent since 1788. Look at the rainfall map, Fig. 626, and you will find the answer to this question. Much of Australia is empty desert, and much of that part where men do live has terrible droughts, when crops fail and animals die of thirst. This is one of the reasons, perhaps the greatest reason, why the continent of Australia has no more people than Illinois—5,300,000 people in 2,974,000 square miles. Australia is as large as the United States, but it is so dry that it never can be made to produce more than a fraction of the amount of food that the United States can produce.

In what continents would you expect to find climates and, therefore, regions like those of Australia? (Figs. 10, 328, 329.)

QUESTIONS

1. On the Australian coat of arms are emblazoned a kangaroo and an emu. Why? Could you suggest an emblem more typical of the continent? 2. Fill in the blanks: Australia is the size of France; Australia is the size of Argentina; Australia is the size of the continent of North America; Australia is the size of my own state. 3. How far is Australia from Hongkong? from San Francisco? from New York? from London? Antipodes means the other side of the world. Why do you think islands near New Zealand got that name? 4. If you have a globe or a good picture of one, draw a 4000-mile circle around northern New Zealand, and tell what propor-



Fig. 617.

tion of the area is land. 5. Fill in the following blanks: Australia's surface for the most part is Temperature for the most part is Rain-fall for the most part is Coast line for the most part is Rivers for the most part are Mountains for the most part are Frost over most of the area is 6. Why was Australia the last important land mass to be discovered?

7. Make the following chart for Australia: (Fig. 620.)

REGIONS.	STATES.	CITIES.

8. What modern inventions can you name that have made possible the great British Empire? How do those inventions help Australia? help you?

9. What river might be called the Mississippi-Missouri of Australia? Why? 10. A patriotic Australian once said that his country could support two hundred million people. Keep that statement in mind as you study the continent of Australia and see what you think of it. 11. What can you find of interest about the kangaroo, the Tasmanian devil, the laughing jackass, the lyre bird, the bower bird?

THE CALIFORNIAN-MEDITERRANEAN REGION

874. The fifth California.—We have already studied four regions that have the climate of southern and central California, which we have called Californian-Mediterranean climate. Where are they? (Secs. 193, 547, 768, 860.) Such a region is always to be found

on the west coast of a continent, and all are about the same distance from the equator.

Australia has two corners having

this Californian climate; one on the southwestern part of West Australia, and the other where South Australia projects southward. There the west winds blow the winter rains upon her shores. (Fig. 626.)

875. Industries like those of California.—We have seen (Sec. 196) that the United States for a long time imported Mediterranean crops from the countries near the Mediterranean. Then, after the railroads were built to the Pacific coast, we began to bring the Mediterranean crops from that part of our own country which had the Mediterranean climate.

Australia has done the same things for the very same reason. In South Australia and in West Australia, as in California, the few white settlers at first followed their flocks of



Finch & Baker, U. S. Dept. Agr.

Fig. 619. The grape acreage of Australia. Compare this with the grape map of the United States (Fig. 30) and see what similarity you notice.



Photo. Publishers' Photo Service, N. Y.

Fig. 618. The pipe line (immediately in front) and pumping station for irrigating South Australian orange orchards. Where else are oranges irrigated?

sheep over the wide pastures. By this means one family could use a great deal of land. Then, as more men came, wheat was grown. (Sec. 195.) Wheat is now the great export of Adelaide, the metropolis of this region, a thoroughly modern city about half as large as San Francisco. The map (Fig. 88) shows that wheat is grown on those coasts of South Australia and Victoria that face the west wind. Also on the slopes of the Flinders Mountains, near Spencer Gulf, where the higher elevation makes more rain, a great deal of





Photo. Publishers' Photo Service, N. Y.

Fig. 621. One of the fine wide streets of Adelaide. The Australian cities are well-planned. Why are the largest of them near the ocean? How many Australian capitals are in the northern half of the continent?

wheat is planted. For the same reason wheat is grown on the highlands in the coolest corner of West Australia.

876. Fruit industry and irrigation.—The third industry to grow up in this region, as in California, was the fruit industry. This requires little land, but much labor. As there is so little rain here, most fruits need irrigation. What have the mountains to do with California irrigation? (Sec. 158.) (Fig. 157.) The Australian mountains are not high enough for summer snowfields, and Australia has a very poor water supply for irrigation. The best water supply is that from the Murray River and its branches. (Fig. 620.) The largest fruit industry in Australia is in the lower part of this valley. This district sends to the other states and even to New Zealand oranges, pears, cherries, dried peaches, dried apricots, dried prunes, raisins, almonds, olives, and wine. So much wine is produced that much of it is exported to England and to British colonies. Preserved and canned fruit are also important exports.

The fruit industry is growing, and the necessary water is being stored, as in our own country. In order to irrigate orchards of oranges and other fruits, the Australians,

in 1920, began building on the Murray River a dam which would make a lake having a surface of about fifty square miles.

877. Big trees and lumber.

—This Australian climate, with its mild temperature and gentle winds, seems to be one that suits big trees where enough rain falls. A similar climate, on the slopes of the Sierra Nevada in California, has given us the sequoia, the tree having the largest trunk found in the world. (Sec. 160.) In Australia are forests of giant eucalyptus, the tallest tree in the world.

The eucalyptus is a very valuable tree indeed, because it yields a useful oil and grows faster than any other tree suited to the Californian-Mediterranean climate. In West Australia there are large forests of certain kinds of eucalyptus which make very tough and durable timber. Many streets in London are paved with these woods, called jarrah and karri.

878. Future.—This region, like all the other Californian-Mediterranean regions, could profitably produce several times as much fruit as it now produces, if a market for it could be found.

QUESTIONS

1. Divide the products of this region into groups according to ease of exportation.
2. For what use is the eucalyptus especially suited? Why?
3. Where are the most grapes grown in Australia? (Fig. 619.) Why? When do Australian fruits get ripe?
4. Can you tell why the fruits from Australia bring a good price in the London markets?

5. Name everything which you see in the picture (Fig. 621) that you might also see in the town which you know best.
6. What city might be called the "Odessa of Australia"? From which of those two cities could flour sell at the lower price in London? Why? Take the journey, on the map, from each city to London.

7. Compare this region with all the other Californian-Mediterranean regions you have studied, as to size, products, importance, and prospects.

THE EAST TEMPERATE AGRICULTURAL REGION

879. A small southeastern United States with cyclonic storm weather.—You will remember that the eastern sides of continents in the latitude of Australia have a region of moist summers that are good for corn. Such regions are found in southeastern United States, in southern Brazil and Uruguay, in Natal, and in China. (Sec. 769.) Australia also has one of those eastern temperate agricultural districts.

To understand this Australian region, we should think of it as we did of the East Temperate Agricultural Region of South America—as another region much like that part of the United States between the South Atlantic Coast and the Great Plains of Oklahoma and Kansas. Find the parts of the eastern coast of the United States that are the same distance from the equator as is the southeast coast of Australia from Bass Strait to Brisbane. What Australian states are between these places?

Cyclonic storms travel from west to east across Australia and the seas to the east of Australia, very much as they do across the United States and the Atlantic Ocean. (Secs. 61 to 66.) This means, of course, that during the passing of one of these storms, the wind at a given place blows from more than one direction. Notice that on our southern Atlantic coast the cold wind comes over the land. (Fig. 64.) What about the cold wind for the southern Australian coast? Which of these coasts do you think has the warmer winter? Why? (Sec. 409.) (Figs. 328, 329).

Having rain all the year, this East Temperate Agricultural Region is a land for forests, pastures, dairy farms, cattle, and corn. Great quantities of butter and meat go from this region to England in refrigerator ships. The Australian east coast plain is narrower than our own, because the Australian mountains are closer to the sea than the Appalachians are. Like our own coast plain, it is by no means all used; much of it is still in forests, and the farms of New South Wales and Victoria together do not grow as

much corn as do the farms of New Jersey, a state not important as a corn producer.

880. Another central Kansas.—After crossing the southeastern mountains of Australia, which are much like our own Appalachians, but not so wide, we soon come into land like central Kansas, or central Argentina. The rainfall is scanty. The plains are treeless. No longer are we in the land of corn. Much winter wheat is grown, as in central Kansas west of the Corn Belt, and in Argentina west of its corn belt. The wheat map (Fig. 88) shows a long belt of wheat just inside the southeastern Australian mountains. This belt is not very wide; so that in all her three wheat regions (Sec. 875, Fig. 88) Australia grows only about as much wheat as our own state of Kansas. The amount, however, is irregular because of droughts.

YEAR.	BUSHELS OF WHEAT HARVESTED IN AUSTRALIA.
1915-16.....	179,000,000
1916-17.....	157,000,000
1917-18.....	121,000,000
1918-19.....	81,000,000
1919-20.....	45,000,000

Australian wheat is grown very much as the Kansas wheat is grown. Many of the reapers and plows are made in the United States, and some of the wheat, like that from Kansas and Manitoba, is eaten in England, almost at the other side of the world from the place where it is grown. In this section, west of the mountains, that part of the land not in wheat is used for great sheep farms (Fig. 630).

881. Cities.—The southeastern farming region is the most populous part of Australia, and has the two greatest cities: Sydney, about the size of St. Louis; and Melbourne, as large as Baltimore. The Australians are proud of their cities, which are as modern, well-built, and up-to-date as any cities in the world.

Sydney and Melbourne are

Fig. 622. Bushels of grain per person (1911-13):

A. Australia	43.0
B. United Kingdom.....	6.7
What facts does this explain?	



capitals of states as well as great centers of foreign trade. Each has a university. Nearly all the manufacturers who are in this part of Australia, as well as most of the traders, do business in these cities.

Sydney has grown larger than Melbourne, partly because of a coal field, which gives her not only power to run her factories, but also supplies an export cargo for ships to carry across the Pacific to New Zealand and to the nitrate ports on the coast of Chile.

QUESTIONS

1. Fill out the following chart with brief answers:

FIGURE.	WHAT IT TELLS ME ABOUT THE EAST TEMPERATE AGRICULTURAL REGION.
Fig. 620.	
Fig. 624.	
Fig. 625.	
Fig. 626.	
Fig. 634.	
Fig. 88..	

2. What important products does this region produce?
3. Name two cities in the southern hemisphere larger than Sydney. Where are these cities? Why are they larger?
4. What is the largest city of Australia? Ships from all nations can anchor in its excellent harbor. What imports do they bring? Take a journey out to San Francisco; to Liverpool; to New York. What exports are sent on each journey? 5. Is the wheat



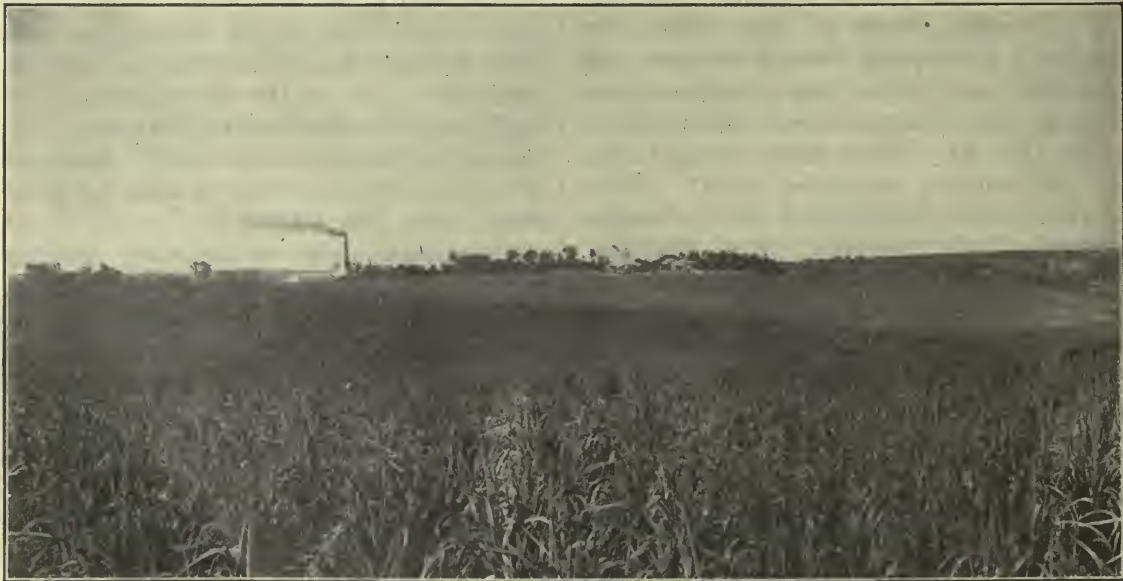
Fig. 624. The density of population in Australia. How much of Australia is rather well-inhabited?

grown in Australia winter or spring wheat? (Secs. 875 and 880.)

6. What effect would an increase of the wheat crop in Australia have upon the price of wheat in the United States? in Central Persia? in Switzerland? in Hwang Valley? 7. What effect would a very poor wheat crop in Australia have on our exports of manufactures to Australia?

THE TROPIC AND SUB-TROPIC AGRICULTURAL REGION

882. What is the region like?—Suppose the coast of Florida (Fig. 10) extended as far toward the equator as the coast of Queensland does. Where would Florida end? Point out the place on the east coast of



Courtesy Commissioner of Australia

Fig. 623. Looking across a sugar cane field near the Queensland coast. Where is the market for the sugar?

South America which has the same latitude as Queensland. Now you should be able to tell why the climate of the coast of Queensland is like the climate of the West Indies and also of east Brazil. What winds blow there and what do the coasts look like to the man who sails along them? (Secs. 364, 803.) You doubtless can tell the kinds of products that grow there, and the kinds of people who can most easily live there.

883. The white Australia question.—The white men who settled along this coast had the same trouble that white settlers had in the West Indies and Brazil; the climate was too hot to permit them to work in the fields. However, as they wanted to run plantations, they had to import men who were used to that kind of climate, and who would work for them. For a time the white men brought in shiploads of people from the South Sea Islands, from India, and from China. These men labored in the fields of sugar, bananas, pineapples, coffee, and cotton.

The presence of so many dark-skinned people alarmed the people of the other states of Australia. They feared that this warm part of Australia might cease to be a white man's land and would become a land of brown, yellow, and black men. So the Commonwealth government passed laws making it very difficult for men of any but the white race to come to Australia. Therefore in most of the Tropic Agricultural



Fig. 625. Cattle in Australia and Tasmania. Compare with the sheep map and the regional map, and see if it shows how hot moist climate separates these two kinds of animals. What does the rainfall map (Fig. 626) tell you about this?

Region you may travel for miles without meeting anyone at all. 884. Tropic agriculture.—Only in some localities along the coast are there

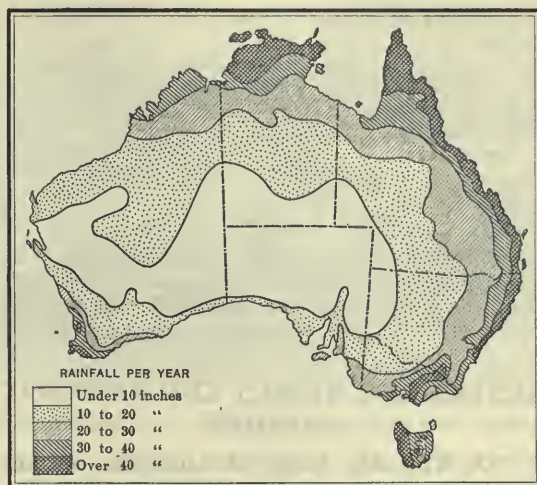


Fig. 626. Compare this map of Australia with the population map. What does the comparison tell you?

many plantations. There nearly enough sugar cane is grown to supply all Australia, which uses about as much as is grown in Louisiana.

Other plantations on the Queensland coast grow bananas, pineapples, and early vegetables for the cities in the cooler land to the southward. Queensland's crops are sometimes injured by drought. The rainfall is light except along the coast and there nearly all the rain falls in summer, leaving the other seasons with little rainfall.

Australia, like the United States, has three orange districts, two in her Mediterranean sections (one in West Australia, and one near Adelaide), and one, like our Florida orange district, on the sub-tropic east coast. It is near the boundary between New South Wales and Queensland.

885. Coast towns.—The small cities along the Queensland coast have stores, meat-packing plants, and wool warehouses, because railroads connect them with the cattle and sheep ranches of the interior (Sec. 888).

886. Future.—This region, like much other undeveloped land in the hot regions, might produce great quantities of agricultural crops if it could have settlers.

QUESTIONS

1. Tell how the presence of people in cool Australia has helped the industries in warm Australia. Also tell how cool Australia has kept back the industries of warm Australia.

2. How I distinguish between the—

REGION.	LOCATION.	CLIMATE.	PRODUCTIONS.	POPULATION.	CITIES.
East Temperate					
Agricultural .					
Tropic					
Agricultural .					

3. Do you think it wise for Australia to exclude all immigrants but white men? How might the black man, the yellow man, and the brown man help the Australian white man to make his country richer?

AUSTRALIA'S DESERT AND PASTORAL REGIONS

887. The dry heart of Australia.—What do you notice about central and western Australia as you examine the maps of sheep (Fig. 630), cattle (Fig. 625), and wheat (Fig. 88)? Look at a place where the tropic of Cancer or of Capricorn touches the western edge of some continent. It is a place where the trade winds blow away from the land. What kind of place is it in South Africa? in North Africa? in South America? in North America? If you have forgotten what kind of a place it is, the rainfall maps (Figs. 144, 540, 541) will give you the answer, which is the same for all the continents—a dry country, a very dry country. How much of it has inland drainage? (Fig. 620.)

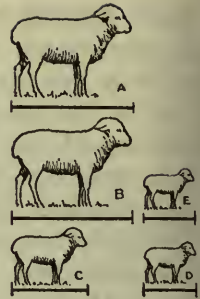
The center of Australia is a desert. The eastern mountains shut off from the interior most of the moisture that southeast trade winds from the Pacific might bring to Australia.



Fig. 627. Prize-winning merino rams. It has been a triumph of breeding to get these fellows wrinkly so that a little sheep in a dry land would have as much wool as a smooth sheep twice his weight.

Fig. 628. Sheep of five nations:

	Million
A. Argentina	83
B. Australia	82
C. United States	50
D. Russia	37
E. Union of South Africa	36



In no other continent does the desert possess such a large share of the land. South Australia is so dry that one-half of it is almost without inhabitants. For the same reason West Australia has fewer people than the state of Arizona, and most of its area cannot be used even for ranches. (Figs. 625, 630.) Drought makes the pasture so poor in the interior of Queensland that the government will let one man have ninety-nine square miles for a farm. The drought also helps to prevent the Northern Territory, which is ten times as large as New York State, from having more people than may sometimes be found in a single building in New York City.

For a long time a ship was the only means by which people could travel from West Australia to the eastern states, but in 1917 the Commonwealth government completed a transcontinental railroad from Port Augusta to the desert gold-mining town of Kalgoorlie. For several hundred miles this road crosses neither stream nor hill and runs without a curve across a bare gravel plain so smooth that automobiles were used to carry materials when the railroad was built.

Notwithstanding the help of camels brought from Africa, many daring men have died of thirst while trying to explore Australia's deserts. Even yet there are places as large as some American states which no white man has ever seen. As in the Sahara and in Arabia, the mountains in the desert have enough rain to provide springs, and areas with enough grass to support some animals.

Photo. Doubleday, Page & Co., N. Y.



Photo. Keystone view Co., N. Y.

Fig. 629. Cattle in the interior of Queensland drinking at an artificial lake. Why must an artificial lake be made?

888. The eastern grasslands.—To the west of the eastern mountains is a wide stretch of level or gently rolling interior plain, drained by the Murray River system. The rainfall gradually grows less and less, as one goes from the forested mountains of the east toward the sandy or gravelly deserts that begin near latitude 140° east (Fig. 620, D2), and stretch away to the Indian Ocean, 1500 miles to the westward.

Most of this grassland is too dry for wheat, but it is much like the grasslands that lie west of the wheat lands of Argentina or central Kansas. It is one of the great sheep-raising regions of the world. Here the herder with his collie dogs drives his flock of two or three thousand sheep backward and forward over most of the territory. Even in the wheat sections at the eastern edge, the grain fields cover but a small part of the land.

Long railroads reach across this plain as they do across the plains of Argentina and central North America. They carry the wool and sheep to market and bring supplies to the few farmers who live on ranches so large that each covers as much ground as a big city, a township, or even as much as a county in the United States. The family of the sheep rancher has a very lonely life so far from neighbors.

889. The tropic grasslands.—The northern part of Australia has a belt of tropic grassland, with a rainy season in the summertime. Its rain is like that of India, though not so heavy. (Sec. 688.) The air over the

north central deserts is heated and rises; then the air from the sea pushes in to take its place. The sea wind, or monsoon, blows from the north for a few months, and brings heavy rains to a belt across the northern part of Australia that has been parched for more than half the year. (Fig. 626.)

During this season of sultry, rainy weather, the land changes from brown to green, as it does in other tropic grasslands (Secs. 748, 808). The grass fairly shoots up; sometimes it grows ten feet high. This country is very much like the tropic grasslands of the Sudan (Sec. 743), but most of it is still unused, and except for a very few scattered natives entirely unsettled. White people are not attracted by the climate.

To make it worse, the coasts of the Gulf of Carpentaria, and other parts of northern Australia are swampy and very unhealthful. Years ago some people brought over some water buffaloes from India, and they are now running wild by thousands in the unused woods and grasslands. On the average, the territory of North Australia has one person to each hundred square miles. One short railroad runs inland from Port Darwin, where there is a meat-freezing plant.

890. The western grasslands.—Like Lower California, the western edge of the desert occasionally receives a little rain from the cyclones that cross central Australia. The sheep and cattle maps show a few animals near the sea.

891. Uncertain rainfall.—The people of



Fig. 630. Map showing where sheep are grown in Australia. Each dot stands for 10,000 sheep. Why is it that no sheep are grown in the central part of Australia? (Fig. 626.)

Australia can never tell what their weather will be. Their rainfall at the best is uncertain. Deluges of rain sometimes drown people in the desert, and in other places the crops wither under months of pitiless sunshine. Drought is the greatest enemy that men have had in making their homes in Australia. At times river freight boats on the Darling River have steamed twenty-five miles across flooded country to deliver freight. At other times at the very same place the river itself is dry. In 1920 an Englishman writing from Sydney said: "For 20 months not a single drop of rain has fallen in vast areas—areas within which the whole of the United Kingdom could be put and there would still be tens of thousands of square miles to spare. The drought has been strengthening its hold on practically the whole interior of Queensland, New South Wales, central Australia, and South and West Australia. The aborigines (natives) call it the 'old man drought,' which signifies that in their opinion it is the most terrible visitation they can recollect. Meantime the dry season has played havoc with the wheat crops."

What can the poor sheep do when it does not rain for a year? Often they perish from hunger and thirst. In some localities the drought of 1920 killed four-fifths of the

sheep. Sometimes they die by millions. Conditions would be even worse if it were not for the artesian wells. In many of the drier parts of the eastern grassland districts there are no running streams, but rain that falls on the eastern mountains sinks deep down into the earth and rocks, where it travels slowly through the layers of porous stone. (Fig. 114.) The Australian government has dug hundreds of artesian wells into these layers of rock. Thus, in times of drought, water may be had for the sheep, if it so happens that farmers can find enough food to keep them alive.

In some places the sheep and cattle for market must be driven for many days to reach a railroad station. The government carefully reserves wide strips of grassland along these trails, so that the animals can eat as they go. Much work is done to build tanks, cisterns, and dams along the way, to store water for the moving animals. Nevertheless whole herds sometimes die of thirst, as their owners, fleeing from drought, try to get their animals to market. At other times Australia has years of heavier rainfall, with plenty of grass and water. Then the flocks increase, and trade is good because the people have something to sell and can therefore buy.

892. The fight with the rabbits.—The rabbit is another of the troubles of the Australian sheep farmer. There is almost no winter in Australia; so rabbits can breed and feed all the year. Pet rabbits that were brought out from England soon ran wild, and increased to such numbers that in many places they ate up the grass, leaving none for the sheep. Men have spent millions of dollars building tight wire fences for hundreds of miles, to keep the rabbits away from the pasture. Where one of these fences crosses a road, the traveler must open a gate. If he should neglect to close it, he must pay a heavy fine. The farmer is compelled by law to kill the rabbits on his own land, but still they run by millions and millions. Sometimes fences have been built around water holes and the rabbits, dying of thirst, piled

up several feet deep outside the fences. During the World War, rabbit skins for hat-making became so high in price that men in the Australian sheep country could make sometimes as much as ninety dollars a week catching rabbits. Your father's felt hat may be made of Australian rabbit fur. Rabbit meat has also been frozen and canned.

893. Minerals.—Australia has rich mines. It was the gold mines of Victoria, now a mile deep, that brought thousands of settlers to Australia about 1851, and now gold, silver, copper, lead, tin, and coal are important exports of Australia. Each day the provision trains from Adelaide go three hundred miles to a place called Broken Hill, in the dry country of western New South Wales, where forty thousand people are busy digging silver and lead from one of the world's richest mines.

It is an astonishing fact that minerals can cause a city to exist for a time in the wildest solitude. Railroads make the miracle possible. Read what a Frenchman says of a gold-mining city of West Australia. ". . . Take Kalgoorlie for example. On the bare moor rise mills arranged in the form of an amphitheater Trains wind about, emptying entire forests into the furnaces. Everywhere the subsoil has been burrowed, and there are sometimes as many as twenty stories of underground galleries.

"Thousands of workmen labor in these hills under the burning sun, blinded and sometimes almost asphyxiated by the smoke, the pulverized refuse of the ores, and the yellow sand of the desert. . . . It is a vast camp, a temporary refuge for a population which will scatter when the last veins are exhausted."

QUESTIONS

1. Fill out the following chart. It will help you understand this region.

FIGURE.	WHAT IT TELLS ME ABOUT THE AUSTRALIAN DESERT AND PASTORAL REGIONS.
Fig. 620.	
Fig. 624.	
Fig. 625.	
Fig. 626.	
Fig. 630.	
Fig. 634.	

2. Why are rabbits called vermin in Australia? 3. If wild rabbits double their number every three months, how many offspring would one pair of rabbits have in five years? What enemies have these rabbits? 6. How might it be said that Molly Cottontail now pays her board?

7. Compare the proportion of desert area in Australia with the proportion of desert in Africa; in South America; in Europe. What effect have deserts on the wealth of continents? 8. How have the railroads across Queensland and New South Wales aided British factories at Leeds and Bradford?

9. What is the elevation of Lake Eyre? Would you want to drink its water? (Sec. 137.) 10. Would a rainfall of 40 inches a year make any difference in its size? See Secs. 137 and 891. 11. On an airplane trip from Port Darwin to Sydney or to Adelaide, what kind of country and what industries would you see?

TASMANIA AND NEW ZEALAND— OTHER OREGONS

894. Good rain and fine forests.—In Chile and in California, we found, you remember, that a short journey toward the pole from the land of oranges brought us to a land where the west winds made heavy rains, at about latitude 40° south in Chile, and 40° north in California. In Australasia the same thing holds true. Tasmania, across Bass Strait, nearly two hundred miles from the island of Australia, and the New Zealand islands, twelve hundred miles to the south-east, are lands of good rain and fine forests. These cooler islands miss the droughts of Australia, and have the climate and the crops of Oregon, of England, and of western France.

895. Tasmania.—Much of Tasmania is mountainous and covered with fine forests. The area is about the same as that of West Virginia, and only a small part of it has been turned into farms. The climate is excellent for fruit, and the factories of Hobart, the capital, make jams, jellies, and canned fruit in great quantities for shipment to Australia and even to England.

Tasmania also has very rich tin mines.

896. New Zealand.—New Zealand was settled about six hundred years ago, by big brown men who came in boats from the islands to the northward. These people, called Maoris, were very different indeed from the black natives of Australia and



Photo. Publishers' Photo Service, N. Y.

Fig. 631. Pear orchards blooming on the slope of a beautiful valley in well-watered Tasmania. In what part of the United States could we find such a scene in a similar climate? Find places on the west shores of three continents having the same distance from the equator that the ends of Tasmania have.

Tasmania. Being very intelligent, they were expert weavers, dyers, wood carvers (Fig. 616), and builders when the British settled New Zealand, which was after Australia was settled. (Sec. 872.) In 1871 the Maoris stopped fighting the white men and were allowed to send some of their number to the New Zealand parliament. They quickly learned the white man's way of doing things. Most of them now live as white people do. They make up about one-twentieth of the population of the islands and are increasing.

New Zealand is about two-thirds as large as Oregon and Washington. It has about half as many people as those states. When the Australian colonies formed the Australian Commonwealth (Sec. 872), New Zealand remained a separate colony, just as Newfoundland did when the Canadian provinces formed the Dominion of Canada. The government of New Zealand is very democratic. Many public utilities, such as railroads, telegraphs, and telephones, are managed by the government, which thus helps the people to do for themselves things which in other countries are done by private enterprise and capital. The state even gives pensions to old people who are poor.

Not only is New Zealand like England in population, but the South Island also resembles England in climate, and in some of its

natural features. It has a mountain system to the west, called the New Zealand Alps, where the rainfall is very heavy indeed, as it is upon the mountains of Wales and of Scotland. Like the eastern part of England, the eastern part of New Zealand is a plain with moderate rain. Here the farmers grow much wheat and other cool land crops. Other parts of South Island have the cool, damp climate suited to potatoes; but there is no market except the home

market and that of Australia, because potatoes are too cheap and perishable to ship to Europe. One of the ways by which the New Zealand farmer feeds many sheep with little labor is to raise a field of turnips, and let the sheep go in and eat them up.

The North Island has such a mild winter that cattle can pasture in the fields all the year, and here many of the farmers keep cows, and make a great deal of butter, cheese, and dried milk. These products are shipped to England because they are so valuable that they can stand the costly freight, as can the other valuable New Zealand products—wool and frozen meat.

There are meat-freezing plants in each of the seven chief ports of New Zealand. Every day ships loaded with frozen New Zealand meat are steaming across the seas, en route to London and other European cities, and sometimes to New York as well.

QUESTIONS

1. How are the mines of Tasmania helpful to her fruit industry? Where does she get sugar?
2. What do the colonists from the United Kingdom find in New Zealand to remind them of their motherland?
3. What products do New Zealand and Tasmania produce which the British need? the motherland which the colonies need?
4. What do they produce that we need?
5. Show some points of similarity and difference between Tasmania, New Zealand, and the Willamette-Puget Sound Region.

6. Complete the following chart:

How I Distinguish Between New Zealand and Tasmania

Topic.	New Zealand.	Tasmania.
Location.....		
Distance from Australia.		
Size.....		
Climate.....		
Chief productions.....		
Important cities.....		
The natives.....		

7. How do you account for there being so much more industry in Tasmania and New Zealand, in proportion to their size, than in Australia, so much larger and so near by? Give all the reasons. 8. Why would you say that the governments of Australia and New Zealand are progressive?

THE TRADE AND FUTURE OF AUSTRALIA AND NEW ZEALAND

897. A raw material region.—People of Australia have a very great trade in proportion to their numbers, because they are a rich people living in a region rich in raw materials. They export raw materials and import a great variety of manufactures. Why? People with so much land find they can make more money by producing raw materials than by working in factories. So we find in each part of the continent, that any given locality exports the things which the conditions of that locality makes it easiest for men with much land to produce.

898. The region and the product.—In South Australia, with the California climate, we found the California products of fruit, wool, and wheat. In the dry pastoral regions of Australia, there are flocks of wool-producing sheep (Fig. 627). In the eastern districts of New South Wales and Victoria more rain falls, and consequently better and richer grass grows. There the farmers have cows, and big, fat sheep which do not bear so much wool as the merinos, but which make much more mutton. At the ports the sheep are

frozen, and then sent in refrigerator ships to Europe and America.

Chief of all the exports of this far continent is wool. Each year about one hundred pounds is exported for each man, woman, and child in British Australia. Much of the best woolen cloth used in the United States is made of wool from Australia.

The hot grasslands of Queensland and the moist grasslands of New Zealand produce beef cattle. Some of the meat is canned, and some of it is frozen at the packing houses in the coast towns.

The great shipments of dairy products come from the moist lands of Victoria and New Zealand.

899. The imports.—Some of the wool, along with much American cotton, comes back from England after it has been made into cloth. The people of Australia import vast quantities of clothing, machinery, metal goods, petroleum, dishes, glass, and all kinds of things which one finds in a store. There are many factories in Australian cities but they do not make half of the thousands of kinds of articles that are sold in Australian stores. Most of the imported supplies come from the United Kingdom and the United States.



Fig. 632. Lake Makatipu in the beautiful New Zealand mountains. On some of these mountains are large glaciers.

Photo. Publishers' Photo Service, N. Y.



Courtesy R. G. Dun & Co., N. Y.

Fig. 633. Stacks of unthreshed wheat. Wagonloads of the grain going to a South Australian railway. How will the English school children who eat this wheat pay the Australian farmer who grows it? This is winter wheat. In what months is it sown in Australia? When harvested?

900. The future trade.—The people of Australia have so much unused land that it will pay them to keep on producing raw materials. All of the cultivated land in Australia is less than one-hundredth of the total area of the continent. Several times as much could be cultivated if the world market needed the produce. The Australians need to use more of their land before they build many factories. That is the reason why Australia, with all her forests, has not a single mill manufacturing paper from wood pulp. This trade of raw materials in exchange for manufactures will probably continue a great many years.

901. The future industry.—If rain fell in Australia as it does in Europe, there would be room for three hundred million people. Even with her deserts and droughts she could feed several times as many people as she does.

As for New Zealand, it is about six-sevenths the size of Great Britain, is almost as good for farming, and is cultivating only one acre in forty. In Belgium two acres out of three are cultivated each year. Plainly, rich New Zealand with

its good climate might easily feed many times as many people as are now living in it. We are safe in saying that Australia and New Zealand can produce for export, if the world needs them, great quantities of fruit, dried milk, butter, cheese, meat, wool, and other agricultural products. It is true, however, that few immigrants are settling there now, and that the population is increasing very slowly.

We should remember that New Zealand and the southern half of Australia are cool lands where white men can be healthy and feel energetic, and that they are now settled by well-educated

white people having a high civilization and a good government.

QUESTIONS

1. Why does one find the center of population and all the important Australian cities near the southeast coast? Compare the location of these cities with South America's centers of population. 2 What changes have been wrought in Australia since the coming of the English? 3. The Australians and New Zealanders are proud to be members of the British Empire. Tell how the trade between the two colonies and the mother country strengthens this bond.

THE ISLANDS OF THE PACIFIC

902. The scattered lands of the brown men.—In the great stretches of the mid-Pacific there are many small islands; how many no one knows.

Their original settlers are supposed to have come from Asia, in canoes, and they spread over all the Pacific from Hawaii to New Zealand, and from Tahiti to Samoa. Many of the islands are not inhabited; indeed most of them are only little low reefs of coral rock covered with sand and shaded by groves of coconut trees.

903. Native characteristics.—The Polynesians are brown people, friendly and polite.

They welcome the stranger and treat him kindly. They love music, dancing, and sports. Often they decorate their bodies with garlands of flowers and wonderful designs in tattoo. Among the Polynesians, men are often honored for their artistry, a high place being given to tattooers, carvers, and builders of canoes. The men are expert boatmen, and everybody swims a great deal in the warm waters of the Pacific. In 1921 Pau Keoloha, the Hawaiian champion, broke the world's swimming record at Adelaide, Australia, by making 100 yards in 52½ seconds.

904. A bounteous land.—This ocean world is a land of delight for the brown man. The tropic heat and moisture, which are so trying for people of the white race, seem to interfere but little with his welfare. Living is easy, because nature has covered these islands with crops. An American, traveling in the Marquesas Islands, says: "In a couple of miles from the water's edge to the jungle



© Publishers' Photo Service, N. Y.

Fig. 635. Ships, freight sheds, and grain warehouses at Melbourne. What do you think is the use of the large inclined pipes at the left of the picture?

tangle of the high hills were thousands upon thousands of coconut palms, breadfruit, mango, banana, and lime trees.

"There is scarcely a need of the islander not supplied by the coconut trees. Their wood makes the best spars, and furnishes rafters and pillars for native houses, the knee and headrests of their beds, rollers for the big canoes or whaleboats, fences against the wild pig, and fuel. The leaves make baskets and covering, screens and roofs of dwellings. . . . On the stiff stalks of the leaves, oily candlenuts are strung to give light for feasts. . . . The network that holds the leaves of the young tree . . . has every appearance of coarse cotton cloth, and is used to wrap food, or is made into bags, and even rough garments, for fishermen especially."

The nuts are a nutritious food, used in many forms.

905. The breadfruit.—The coconut is only one of many food trees of this bounteous region. Before white men began to trade with these people, the main food of the native was breadfruit. Breadfruit grows on a tree, and looks like an enormous rough-skinned



Fig. 634. Railways and navigable rivers of Australia and Tasmania. Few of these rivers are navigable all the time. Why?



Fig. 635. A section of ocean cable one-half size. The small wires in the center do the work. The rest is protection. First, gutta-percha insulation; second, tough waterproof fabric; third, strong wire, called armor; fourth, waterproof fabric.

orange. Not only do the Polynesians eat this fruit daily, but they make of it a starchy food called *popoi*, which they store in pits dug in the earth, and thus keep it for many months to guard against famine.

"As bread is to us, so was *popoi* to my tawny friends. They ate it every day, sometimes three or four times a day. As the peasant of certain districts of Europe depends on black bread and cheese, the poor Irish on potatoes, . . . the Scotch on oatmeal, so the Marquesan (and other Polynesians) satisfies himself with *popoi*, and likes it really better than anything else."

909. The coming of the white man.—The white man's trading ships have changed the life of the people on the larger islands. Small trading vessels, which are really floating stores, sail around Polynesia. The trading room of such a vessel is packed from floor to ceiling with a great variety of goods, such as pins and anchors, harpoons and pens, crackers and jewelry, cloth, shoes, medicines, tobacco, soap, socks, and writing paper. These goods are traded for copra, the dried meat of the coconuts. Thus the coconut becomes the great basis of trade with the white man. The copra is carried to Sydney, Australia; to Wellington and Auckland, New Zealand; and to Samoa, and Honolulu. At these ports it is crushed for oil or shipped on steamers to Europe and America. We use copra for shredded coconut; also the oil from it for cooking fat, or for soap fat. We can get enormous quantities of copra if we should need it, for the coconut tree grows on nearly all shores between Cancer and Capricorn.

It is a sad fact that white man's rum and white man's diseases have killed many of the Polynesians. Even the measles sometimes killed half the people on an island; and some islands, populous when the white men came, have again become jungle.

907. Hawaii.—The Hawaiian Islands, the largest group of the brown men's tropic isles, are as large, all together, as Rhode Island and Connecticut. Like Tahiti and Marquesas, this group was built up from the bottom of the deep sea, by the outpourings of lava from several volcanoes which have finally raised their heads far above the surface of the water. The decayed lava makes very rich soil and the trade wind brings much rain (Fig. 641); so the islands are a splendid place for tropical farming.

A hundred years ago, American missionaries went to Hawaii to teach the natives our way of living. Finally the people asked their queen to resign and voted that the island should be joined with the United States. It is now an American territory, with a government much like that of our own state governments. Hawaii sends a representative to our Congress at Washington.

Many Hawaiian sugar plantations are owned by American capitalists. Many of the native Hawaiians have died, and immigrants have come to work in the canefields which stretch like a sea of green across the rich slopes. The white man does not like to work under the tropic sun much



Courtesy "The World's Markets"

Fig. 637. Ocean cables. Who owns Midway, Guam, Yap, Cocos, Mauritius, Fiji? (Fig. 10.)



Fig. 638. Pineapples on the Hawaiian lava slopes, ripening for the canning factory. See where the pineapples in your grocery were canned.

Courtesy U. S. Dept. Agr.

more than do the Polynesians; so high wages have been paid to other workers who have been brought to these shores.

POPULATION OF HAWAII IN 1920

Hawaiians.....	38,000
Americans.....	31,000
Chinese	23,000
Japanese.....	110,000
Portuguese ..	25,000
Filipincs	22,000
Porto Ricans.	5,000

The sugar plantations are among the finest in the world. They are managed by the Americans and worked by the various immigrants. There are 1500 miles of irrigation canals, and 70 miles of tunnels, to carry water from the rainy to the drier side of the islands. (Fig. 641.) In many plantations the water is pumped up several hundred feet to the canefields. Scores of shiploads of sugar are sent to the United States each year.

The export next in importance is pineapples. The fruit is canned in great quantities, for it is used in the American navy and in many American homes. Bananas are also sent to our Pacific coast ports. Many kinds of crops are grown for home use. Among these is rice, which the Chinese and Japanese immigrants grow as it is grown in China.

908. Trade.—Look at the map (Fig. 9) and see if you can tell why Honolulu, the beautiful capital of Hawaii, is called the crossroads of the Pacific.

It is a modern city with steamships, trolleys, schools, telephones, and most things that one finds in the United States. Hawaiian trade has increased greatly since Hawaii became part of the United States; most of her trade is with us. We take nearly all of the Hawaiian sugar, pineapples, and bananas. Ships going to Hawaii carry the manufactures that are wanted in Honolulu and



Fig. 639. Expert South Sea Island pearl divers. Note the diving goggles.

Courtesy R. G. Dun & Co., N. Y.

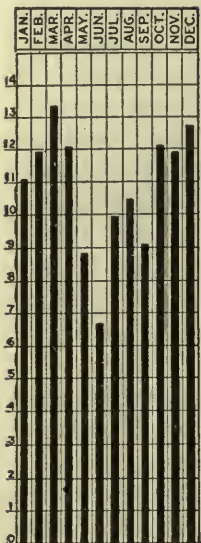


Fig. 640. Rainfall of Hilo, Hawaii (143.4 inches), located on a northeast shore in the trade winds, at the base of a high mountain. Trade wind shore type. Is this grassland or forest land?

inches in size, to wrap about themselves for clothing.

910. Fiji, another group of islands, six hundred miles to the southwestward from Samoa, belongs to Great Britain. The native Polynesians do not want to work on the Englishman's plantations, so many thousands of people have been brought from India to work in the canefields. Sugar is the chief export of this group of islands.

911. The islands of the black men.—Between Fiji and New Guinea are the New Hebrides, the Solomons, and the Bismarck Islands. Here the native people seem to be much like the natives of Australia. They are not nearly so pleasant to meet as the Polynesians, for it has long been their habit to eat people. But now, since the Europeans and Australians govern these islands, the natives usually sell coconuts instead of eating their neighbors. Missionaries have been surprised to find how quickly cannibals change their habits when they are taught by good people.

The French island of New Caledonia has

in other Hawaiian places. 909. Samoa.—A part of the Samoan Islands belongs to the United States, and a part belongs to Great Britain. If the Samoans want a little extra money they can go out, pick up some coconuts, cut them open, dry the meats, and have copra to sell. Copra is the chief export. The people even pay taxes in copra. The trees grow so well on these islands that the Samoans have more coconuts than are needed to meet their own simple wants. They do not want many things. They live in grass houses and use a piece of cotton cloth called a *lava lava*, forty-four by seventy-two

one of the world's richest deposits of nickel, and many shiploads of this ore are sent each year to Europe and America for smelting.

912. Future.—The area of the Pacific Islands is not great, but if fully used they could produce large quantities of sugar, as well as coconut and other tree crops. Hawaii has a suggestive new tree crop industry in the mesquite tree. (Sec. 151.) Its nutritious beans are picked up off the rough ground on which the tree grows, and sold for as much as corn. They are made into meal and used as stock food.

QUESTIONS

- 1. Locate the islands mentioned in the text and the Cook Islands; the Society Islands; Tahiti; Yap. Tell the importance of the coconut to the people of these islands before and after the white man came.
- 2. What do the Samoan chief and his little boy have which came from far-off lands? (Fig. 614.) How do you think the chief made the money with which he paid for these articles?
- 3. At which of the islands of the Pacific would you be most likely to stop on your way to Japan? to Australia?
- 4. Why are Guam and Yap important? Who own them?
- 5. What kind of sports do the Hawaiians enjoy? Why?
- 6. Islands of the South Seas:

NAME.	BELONGS TO	PRODUCES TO SELL	BUYS FROM OTHER LANDS.



Fig. 641. Map of Maui, a mountainous Hawaiian island in the path of the Northeast Trade Wind. The rainfall is shown by lines and figures. Thus the top of the larger mountain has over 150 inches. What is the highest rainfall on the island? the lowest? What parts of the United States have rainfall like the two sides of this island? (Fig. 158.) What differences would you see in looking at the northeast and southwest sides of the island as you sailed around it?

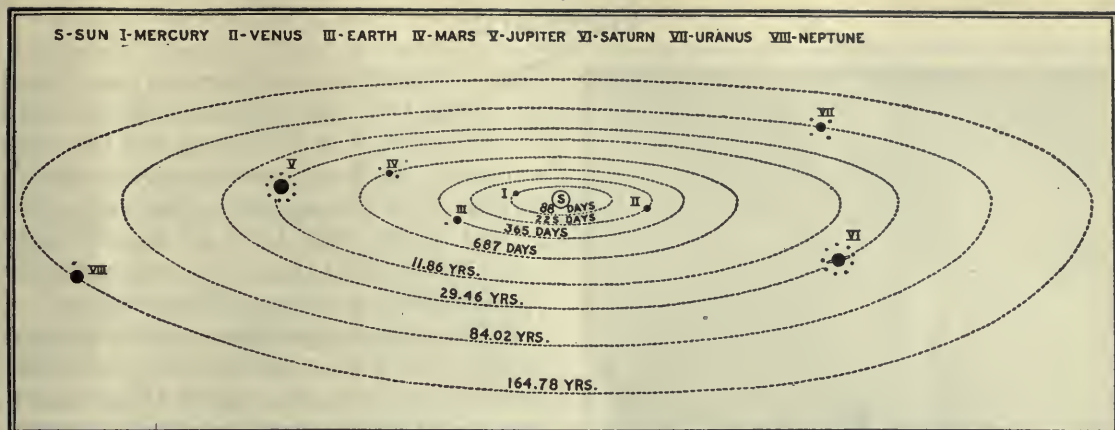


Fig. A. The sun, the eight large planets of the solar system, and their satellites.

APPENDIX, PART I

MATHEMATICAL GEOGRAPHY

THE EARTH AS A PLANET.

1. A huge body moving through space.—We have studied about the various parts of the earth's surface as the homes of men, but we have not yet studied about this earth as a whole. There are many interesting things about the earth as one of the many huge bodies of matter moving around through space. The earth is one of several planets revolving around the sun.

2. Revolving around the sun.—The planets revolve around the sun very much as a weight on a string revolves around your hand when you hold the string and swing the weight around and around. The time required for a complete revolution of the earth around the sun we call a year, 365 days, 5 hours, 48 minutes and 46 seconds. But because of the part of a day over 365 days, every fourth year is leap year. But having leap year every four years is a little too often (can you tell why?), so leap year skips once every 400 years.

How long does it take the planet Neptune to revolve around the sun? It is nearly thirty times as far from the sun as the earth is. What is the average distance of the earth from the sun?

The path, or orbit, of the earth around the

sun is not exactly a circle. It is an ellipse, or a circle that is flattened a little.

SOME SOLAR SYSTEM FACTS

	Mean Distance from Sun, Millions of Miles	Mean Diameter, Miles	Number of Satellites
Sun.....	....	864,400	..
Mercury.....	36.0	3,000	0
Venus.....	67.2	7,700	0
Earth.....	92.9	7,918	1
Mars.....	141.5	4,340	2
Jupiter.....	483.3	88,400	9
Saturn.....	886.0	74,200	9
Uranus.....	1781.9	30,200	4
Neptune.....	2791.6	34,800	1

3. Satellites or moons.—Some of the planets have smaller bodies, called satellites, that revolve around them very much as the planets themselves revolve around the sun.

The earth has one satellite, the moon, which has about one-fourth (0.27) as great a diameter as the earth, and is about 240,000 miles from the earth.

Astronomers, who have a very interesting time finding out things about the earth and the heavenly bodies, tell us that the moon has no air, and for that reason is as cold as Greenland's ice cap.

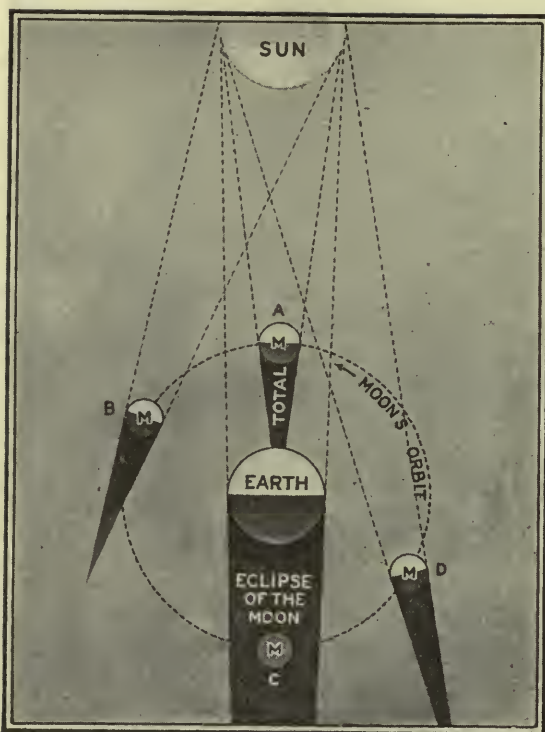


Fig. B. Position of the moon, earth, and sun when we have eclipses.

4. The moon's phases—new moon and full moon.—The part of the moon that is turned toward the sun shines with sunlight which is reflected to us as is the light from any distant hill. That is the reason we see the moon. The part that is turned away from the sun is in the dark, as the dark side of the earth is at night. (Fig. B.) Look carefully at the new moon some time; then tell yourself where the sun is at that moment, and you can see how it is shining on one side of the moon and not on the other. Fig. B shows all this very well indeed. You can see that a person on the dark side of the earth (where it is night) would see more of the light side of the moon when it is at D than when it is at B. Where should the moon be to show still more light?

The moon revolves around the earth every $29\frac{1}{2}$ days. That is why we never see it in the same place two nights in succession.

5. Eclipses.—Fig. B also shows how we have eclipses of the sun and moon. The very black parts in the picture are the shadows of the earth and the moon as the sun shines upon

them. Sometimes, as the moon goes 'round and 'round the earth, it gets in between us and the sun, as at A on the figure, and hides the sun completely from a small part of the earth's surface—that part under the shadow marked "Total." We then have an eclipse of the sun. Now look at the figure, and explain for yourself what an eclipse of the moon is.

6. The moons, or satellites, of other planets.

—The table of solar system facts shows that satellites are quite the style in the solar system, and that the earth is one of the poor brothers. Think what our night would be if we had as many reflectors as Jupiter!

7. Gravitation and tides.—The heavenly bodies are pulling each other all the time. We call this pull *gravitation*. It is the gravitation of the earth for the stone that gives the stone weight. The earth and the moon pull each other all the time, and the sun and the earth pull each other all the time. Now one of the laws of gravitation is that its pull is harder on things that are near to each other than on things that are far apart. When it pulls the solid earth the earth moves as one piece, so the center of pull is at the center of the earth's weight, or center of gravity as it is called. That is somewhere near the center of the earth, about 4000 miles farther from the moon than the surface of the earth is. Because of this difference in distance, the moon pulls the sea water on the side of the earth nearest the moon farther than it pulls the earth. This makes the sea rise on the side toward the moon, and we call it high tide. But the water on the other side of the earth is 4000 miles farther away than the earth's center of gravity, so it is not pulled as much as the earth. That makes high tide on the other side of the world, too. Thus there are two high tides each day on our spinning world. One is on the part of the earth that is toward the moon, and one is on the part that is turned away from it.

8. Spring tides and neap tides.—The pull of the sun also makes tides, and when the sun and moon pull together (position A in Fig. B), tides are higher than common and are called spring tides. When they pull against

each other (position B in Fig. B) the tides are lower than common and are called neap tides.

9. Cotidal lines.—In the open sea the high-tide wave runs around the world following the moon. When it strikes the shores its direction and speed are often changed by the shape of the land. The twelve o'clock line (XII NOON) is close to the entrance of New York Bay and of Long Island Sound. (Fig. C.) See how islands check its speed between one o'clock and four, especially in the bay at the eastern end of Long Island.

Notice that the East River, between Manhattan Island (compare Fig. 278) and Long Island, has tides running in from both the north and the south, and that the Sound tide (IV), gets there about two hours after the New York Bay tide (II P.M.).

10. Height of tides.—The height of the tide depends upon the shape of the bay. Bays with narrow mouths have low tides and bays with wide mouths have higher tides. The Arabic figures (Fig. C) show the 1 o'clock tide at the end of Long Island Sound to be

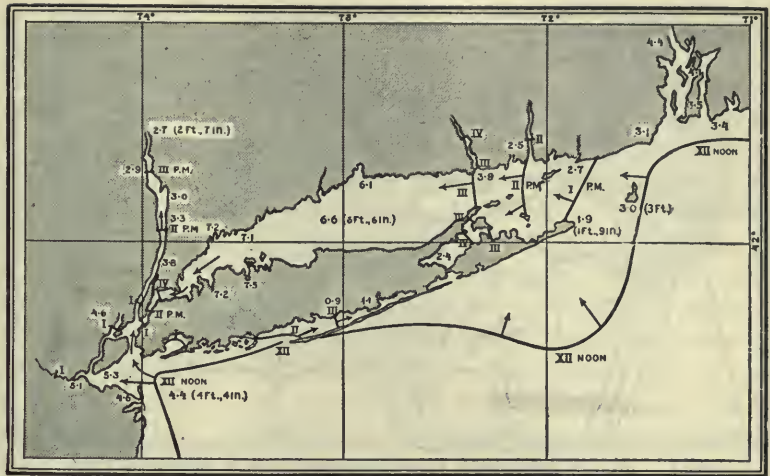


Fig. C. Map showing Long Island and vicinity with co-tidal lines, or lines connecting points having high tide at the same time.

Courtesy U. S. Coast and Geodetic Survey

only 1.9 feet. How high is it near the west end of the sound? Low tide is called ebb tide.

In East River, the tide from Long Island Sound is so much higher than the tide from New York Bay, that water rushes through into New York Bay with a swift current (tidal race), so dangerous to ships that the early sailors called it Hell Gate.

We measure elevations on land from *sea level*,—which is half way between high and low tide.

11. Latitude and longitude.—Suppose you had a nice new baseball and knew that there was a nugget of gold hidden just beneath the cover in such a way that it could not be felt or seen. How would you tell any one just where it was?

Now suppose you took a spot on the ball and called it north pole, and another exactly on the other side and called it south pole. Then suppose you drew a line from pole to pole and called it the first or prime meridian, and then drew another line clear around the world half way between the poles, and called it equator. Now you could locate your nugget by saying that it was a certain distance on the north pole (north) side of the equator and a certain distance on the left (west) or right (east) side of the prime meridian. (Fig. D.)

That is the way geographers locate places on the earth's surface. Instead of saying a

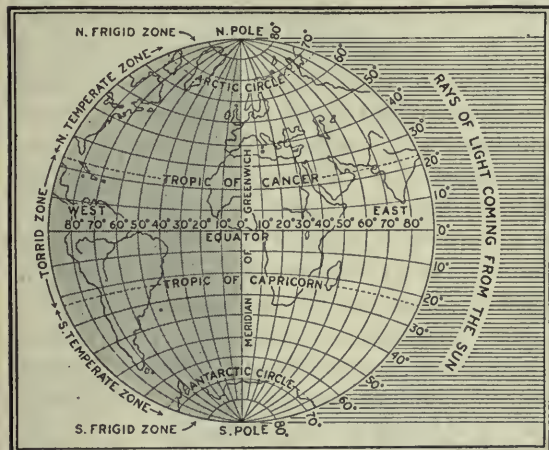


Fig. D. Map showing latitude, longitude, day and night, the sunrise line and the zones.



Fig. E. Map of the United States showing belts of Standard Time.

place is so many miles north or south of the equator, or east or west of the prime meridian, they use a fraction of the distance around the earth. For a long time mathematicians have divided circles into 360 equal parts called degrees. Thus a quarter of a pie is 90 degrees along the edge of the crust, and a quarter of the way around the world is 90 degrees.

The geographer locates Cairo, Egypt, by saying it is on a meridian 31 degrees east of the prime meridian, and 30 degrees north of the equator, on a line parallel to the equator called a parallel of latitude. Find Cairo, in Figs. 10 and D. Geographers use the meridian that passes through the observatory at Greenwich (a part of London) as the prime meridian, and measure distance east and west of that in *degrees of longitude*, and distances north and

south of the equator in *degrees of latitude*. For more exact locations each degree is divided into 60 minutes and each minute into 60 seconds.

Degrees differ greatly in length. You can quickly see that $\frac{1}{360}$ of the distance around the earth at the equator, where it is large, will be much more than $\frac{1}{360}$ of the distance around the earth near the pole. For exact lengths of degrees of longitude at different

distances from the equator, see the table at the bottom of the page.

12. **The shape of the earth.**—We say the earth is round like a ball; but it is not exactly round. Actually, it is slightly flattened because it spins so fast. The other planets are also flattened a little for the same reason. The earth turns around an imaginary central line called the axis, of which one end is the North Pole and the other end is the South Pole. It is so nearly round that the polar diameter (distance through the earth from pole to pole) is 7899.4 miles, while the equatorial diameter is 7926.7.

13. **Keeping time.**—Fig. D also shows us something about how we count time. The earth rotates on its axis from west to east, and every time it goes around once we call it a day, divided into 24 hours. In Fig. D we see at the right the rays of the sun, which are always lighting up one-half of the earth and leaving the other half in shadow. In this figure the Greenwich meridian is the shadow line, or sunrise line. Therefore it is sunrise at Greenwich, and since the sun shines on both poles we know (Fig. F) that it must be March 21st or September 21st.

How fast does sunrise travel? In 24 hours it goes round the world, 360 degrees. In one hour it therefore goes 15 degrees. How long does it take to go one degree?

14. **Standard time.**—How shall we keep time on this whirling globe where the sunrise

LENGTHS OF DEGREES OF LONGITUDE AND OF THE DAY ON CERTAIN PARALLELS

At Latitude (degrees)	Number of hours or days of sunshine—Longest day	Statute Miles
0.....	12h 08m	69.172
10.....	12h 43m	68.129
20.....	13h 21m	65.026
30.....	14h 05m	59.956
40.....	15h 01m	53.063
50.....	16h 23m	44.552
60.....	18h 53m	34.674
70.....	73 days	23.729
80.....	138 days	12.051
90.....	192 days	0.000

and noon travel westward many miles a minute? How many miles a minute? Since we have the habit of meeting trains we need to agree on how we shall set our clocks. For convenience we divide the United States into bands or belts (Fig. E) about 15 degrees wide. In the eastern belt everybody keeps 75th meridian time. In the central belt everybody keeps 90th meridian time. The lines between the belts are irregular because it would be very inconvenient for the conductor of a train to change his time a few miles outside of a city like Columbus, Ohio, or Salt Lake City, Utah. Therefore we zigzag the edges for the sake of convenience. Every time a traveler going west crosses into a new time belt he sets his watch backward one hour. If he goes eastward he sets it forward one hour.

15. International date line.—Suppose he went westward clear around the world, setting his watch back an hour every fifteen degrees. When he got back home, he would be one day behind the calendars of the home folks. Those twenty-four hours that he had lost by moving his watch back would have taken a day, and he would therefore say it was Saturday when it was really Sunday. To avoid this trouble men have made an international date line out in the Pacific Ocean (Fig. 10) where it will make the least trouble. Every time you cross that line going east you move

your calendar back one day. Going west you move it ahead one day.

16. Change of seasons.—To understand our change of seasons, do the following: On a sheet of paper mark a place near the center, and call it sun. Around this draw a line to show the path of the earth. Now stick a pin into the paper somewhere in your path of the earth. This pin represents the earth's axis. The flat sheet of paper represents the plane of the earth's path or orbit. The axis of the earth points to the same place in the sky all the time, and it is not perpendicular to the plane of the orbit. Look at Fig. F and see that the axis is slanting. Remember that the earth goes clear around the sun, and you can see that the North Pole is in darkness when it is inclined away from the sun during northern winter. On December 21st, our shortest day, the sun shines on the surface of the earth no farther north than the place marked by the Arctic Circle. At that time a place just south of the Arctic Circle has only a few minutes of sunshine each day, and places inside the Arctic Circle have many days with no sun at all.

When the earth is on the other side of the sun, June 21st, the North Pole (Fig. F) is inclined toward the sun, and the sun shines clear across it to the Arctic Circle on the other side. At this time a place just south of the Arctic Circle has only a few minutes daily when the sun cannot be seen,

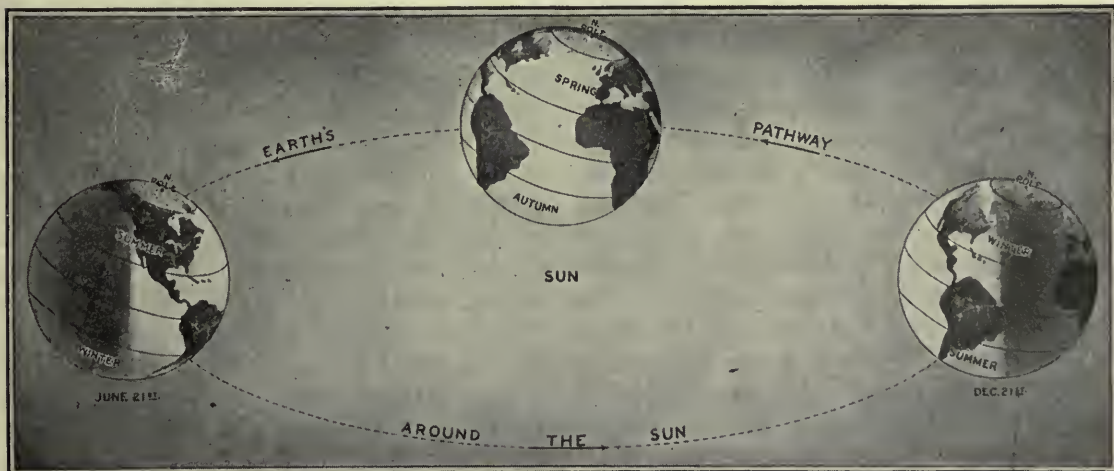


Fig. F. Three positions of the world showing how the inclination of the earth's axis to the plane of its orbit (Sec. 16) causes change of seasons.



Fig. G. The earth's prevailing winds and air circulation.

and, places north of the Arctic Circle have many days when the sun does not set at all. This makes the Arctic tundra have such surprising plant life (Sec. 355). The Antarctic Circle is $23\frac{1}{2}$ degrees from the South Pole.

The Tropic of Cancer, $23\frac{1}{2}$ degrees from the equator, is the most northerly place on which the sun's rays fall perpendicularly in *June*. The Tropic of Capricorn is the same distance south of the equator. Can you tell why?

17. Equinox.—On the 21st of March and the 21st of September the sun shines on both poles (Fig. F). The days and nights are everywhere of equal length, and for that reason we say it is *equinox*.

18. The zones.—Geographers have divided the earth into belts called zones (Fig. D) because of the differences in sunshine at different seasons. The zone along the equator between the tropics of Cancer and Capricorn is called the *torrid* zone because of its heat. Around each pole there is a *frigid* zone, so named because of its cold. The Arctic Circle bounds the northern, and the Antarctic Circle the southern frigid zone. Between each frigid and the torrid zone there is a *temperate* zone, so called because its average temperature is between that of the torrid and that of the frigid zones. Find all the zones on Figs. F and G. In which zone do you live? In which zone is it winter when we have summer.

19. The wind systems of the world.—Examine this drawing (Fig. G) carefully, and you will see that at the equator, where the air is very hot and therefore light, it is ascending. (See edges of drawing.) At high elevations it turns and travels back toward the poles, while surface winds, the trade winds, come from the northeast and the southeast to take its place (Fig. 540).

Just north of the Tropic of Cancer and again south of the Tropic of Capricorn is a region of descending air where there is so little wind that sailing vessels sometimes have trouble to keep sailing along. Sailors call these places the Horse Latitude calms.

North of the Northern Horse Latitudes and south of the Southern Horse Latitudes the wind blows so nearly from the west that these zones are called the prevailing westerlies. These westerlies blow very regularly, but it is hard for the people who live in the midst of these winds to understand that they are in the zone of the westerlies because of the great eddies or cyclones, several hundreds of miles across, that come along every few days. One of these cyclones is shown in the westerly wind zone of the Northern Hemisphere (Fig. G). It blows along with the westerly winds, but around its center the wind is blowing in all directions. For a full account of the cyclones see Secs. 59 to 72, and of the trade winds, Secs. 741, 744.

20. Ocean currents.—As the wind blows over water it rubs against the surface. This rubbing or friction draws the water along with the wind. Thus the ocean has currents. Look at Fig. 327. What direction have the currents in the Atlantic and Pacific oceans where the prevailing westerlies blow? where the trade winds blow? The currents in the Indian Ocean north of the equator blow one way in winter and another in summer. Examine Figs. 509 and 510 and see if you can not explain why these currents thus change.

How do the North Atlantic and North Pacific currents help you understand why the climate is so much alike on the east sides of the two oceans and also on their west sides?

APPENDIX, PART II

SOME IMPORTANT STATISTICS, ETC.

I. COUNTRIES OF THE WORLD. Area in square miles, total population, population per square mile, value of trade with the United States, and value of total imports and exports.

Figures of total population and area per square mile, taken from the most reliable authorities available, are given for the year indicated. Figures of total imports and exports approximate trade values in normal years. Several things influence the amount of trade that the people of a country may have. It may be small because the people are poor, as in Mexico, or because the country has a great variety of resources and industries. Thus the United States has a greater variety of resources than the United Kingdom, but less trade per capita because we supply so many of our own needs. Calculate the per capita trade of the United States; of the United Kingdom. Newfoundland, Cuba, and Canada have a much smaller variety of resources than the United States. Estimate the per capita trade of China; of the Falkland Islands. Explain the difference.

COUNTRY.	AREA, SQ. M.	TOTAL POPULATION.	POP. PER SQ. M.	TRADE WITH U. S. 1920.	TOTAL IMPORTS AND EXPORTS.
NORTH AMERICA	8,500,000	150,000,000	..	..	..
Alaska..... 1920	590,884	54,899	..	\$97,800,000	\$100,800,000
Bermuda Islands..... 1920	20	22,000	1,100	6,000,000	8,000,000
Canada..... 1921	3,729,700	8,788,000	2	1,584,000,000	2,576,000,000
Alberta..... 1921	255,300	588,000	2	.....	.....
British Columbia..... 1921	355,900	525,000	1	.....	.....
Manitoba..... 1921	251,800	610,000	2	.....	.....
New Brunswick..... 1921	28,000	388,000	13	.....	.....
Northwest Territory..... 1921	1,242,200	8,000	..	.....	.....
Nova Scotia..... 1921	21,400	524,000	24	.....	.....
Ontario..... 1921	407,300	2,934,000	7	.....	.....
Prince Edward Island..... 1921	2,184	89,000	40	.....	.....
Quebec..... 1921	706,800	2,361,000	3	.....	.....
Saskatchewan..... 1921	251,700	758,000	3	.....	.....
Yukon Territory..... 1921	207,100	4,157	..	.....	3,390,000
Central America	218,900	5,716,000	26	.....	.....
British Honduras..... 1921	8,600	45,000	5	7,000,000	.....
Costa Rica..... 1920	23,000	468,000	20	20,000,000	30,000,000
Guatemala..... 1914	48,300	2,004,000	41	30,000,000	32,000,000
Honduras..... 1921	44,300	637,000	14	24,000,000	25,000,000
Nicaragua..... 1920	49,200	638,000	13	17,000,000	28,000,000
Panama..... 1920	31,900	401,000	13	.....	.....
Panama Canal Zone..... 1920	436	21,650	49	.....	.....
Salvador..... 1921	13,200	1,501,000	114	20,000,000	38,000,000
Greenland..... 1911	830,000	13,500	..	230,000	.....
Mexico..... 1918	767,300	15,502,000	20	387,000,000	.....
Newfoundland..... 1920	42,700	264,000	6	15,000,000	69,000,000
Labrador..... 1919	120,000	3,647	..	.....	.....
United States (Land Area)..... 1920	2,973,890	105,710,620	36	.....	10,170,814,000
West Indies	92,400	9,933,000	108	.....	.....
Bahama Islands..... 1921	4,400	53,000	12	.....	.....
Cuba..... 1919	44,200	2,889,000	65	1,236,000,000	1,290,000,000
Dominican Republic..... 1919	19,300	955,000	49	79,000,000	.....
Haiti..... 1913	11,100	2,500,000	225	28,000,000	.....
Jamaica..... 1921	4,200	858,000	204	25,000,000	48,200,000
Lesser Antilles..... 1918	5,600	1,343,000	240	.....	.....
Porto Rico..... 1920	3,435	1,309,172	381	280,000,000	304,000,000
Virgin Islands (U. S.)..... 1917	149	26,051	175	8,000,000	.....
SOUTH AMERICA	7,570,000	56,400,000	7	1,385,000,000	.....
Argentina..... 1921	1,153,400	8,699,000	8	420,000,000	1,196,000,000
Bolivia..... 1915	514,200	2,890,000	5	15,000,000	92,000,000
Brazil..... 1920	3,275,600	30,645,000	9	385,000,000	956,800,000
British Guiana..... 1921	89,500	298,000	3	11,000,000	.....
Chile..... 1920	289,800	3,755,000	13	175,000,000	432,400,000
Colombia..... 1918	440,800	5,855,000	13	112,000,000	.....
Dutch Guiana..... 1921	46,100	113,000	2	3,000,000	.....
Ecuador..... 1919	118,600	2,000,000	17	26,000,000	50,600,000
Falkland Islands..... 1911	6,500	3,300	..	.....	12,000,000
French Guiana..... 1911	32,000	49,000	1	1,000,000	.....
Paraguay..... 1917	75,700	1,000,000	13	3,000,000	9,200,000
Peru..... 1919	722,500	4,500,000	6	110,000,000	144,900,000
Uruguay..... 1920	72,200	1,495,000	21	67,000,000	138,000,000
Venezuela..... 1920	398,600	2,412,000	6	51,000,000	69,000,000

COUNTRY.	AREA, SQ. M.	TOTAL POPULATION.	POP. PER SQ. M.	TRADE WITH U. S. 1920.	TOTAL IMPORTS AND EXPORTS.
EUROPE.....	3,870,000	464,680,000	..	.....	.....
Albania..... 1918	11,000	1,400,000	127	.....	.....
Andorra..... 1918	191	5,000	26	.....	.....
Austria..... 1919	30,700	6,131,000	200	\$21,000,000	.....
Belgium..... 1920	11,700	7,684,000	657	330,000,000	.....
British Isles..... 1921	121,600	47,308,000	389	5,695,000,000	\$9,200,000,000
Great Britain..... 1921	88,800	42,768,000	483	.....	.....
England..... 1921	50,900	35,679,000	701	2,109,000,000	.....
Wales..... 1921	7,500	2,207,000	294	.....	.....
Scotland..... 1921	30,400	4,882,000	161	150,000,000	.....
Ireland..... 1921	32,600	4,390,000	135	80,000,000	.....
Other Islands..... 1911	300	149,000	497	.....	.....
Gibraltar..... 1921	2	17,700	8,900	.....	.....
Malta..... 1920	118	225,000	1,907	.....	.....
Bulgaria..... 1920	40,700	4,861,000	119	7,670,000	69,000,000
Czechoslovakia..... 1921	54,200	13,596,000	251	.....	.....
Danzig..... 1919	790	330,000	418	.....	.....
Denmark (total)..... 1921	17,100	3,289,000	192	106,000,000	690,000,000
Faroe Islands..... 1921	540	21,300	39	.....	.....
Estonia..... 1920	23,200	1,750,000	75	.....	.....
Finland..... 1919	149,600	3,335,000	22	24,000,000	.....
Fiume..... 1919	8	50,000	6,250	.....	.....
France (total)..... 1921	212,700	39,210,000	185	842,000,000	6,900,000,000
Corsica..... 1921	3,400	282,000	83	.....	.....
Germany..... 1919	172,000	55,000,000	320	400,000,000	.....
Greece (total)..... 1919	41,900	5,000,000	119	60,000,000	.....
Crete..... 1920	2,950	118,000	40	.....	.....
Hungary..... 1921	35,700	7,841,000	220	.....	.....
Iceland..... 1920	39,700	95,000	2	.....	19,700,000
Italy..... 1921	118,000	40,070,000	340	447,000,000	1,426,000,000
Sardinia..... 1915	9,300	881,000	95	.....	.....
Sicily..... 1915	9,900	3,793,000	383	.....	.....
Territory acquired from Austria..... 1921	7,400	1,408,000	190	.....	.....
Jugoslavia..... 1920	95,600	11,338,000	119	.....	.....
Latvia..... 1920	25,000	1,503,000	60	.....	.....
Liechtenstein..... 1912	65	11,000	169	.....	.....
Lithuania..... 1919	59,600	4,800,000	81	.....	.....
Luxemburg..... 1916	999	264,000	264	.....	.....
Monaco..... 1913	8	23,000	2,875	.....	.....
Netherlands..... 1920	12,600	6,841,000	543	341,000,000	2,088,400,000
Norway..... 1920	125,000	2,646,000	21	116,000,000	611,800,000
Poland..... 1921	149,000	26,886,000	180	70,000,000	.....
Portugal (total)..... 1911	35,500	5,958,000	168	34,000,000	156,400,000
Azores..... 1911	922	243,000	264	.....	.....
Madeira Islands..... 1911	314	170,000	541	.....	.....
Rumania..... 1919	122,300	17,393,000	142	11,000,000	207,000,000
Russia (Great, Ukraine, White)..... 1920	1,488,200	93,388,000	63	.....	.....
Russia (Soviet Federation)..... 1920	7,438,400	124,051,000	17	17,000,000	.....
San Marino..... 1920	38	12,000	316	.....	.....
Spain (total)..... 1919	194,800	20,784,000	107	194,000,000	437,000,000
Balearic Islands..... 1919	1,900	331,000	174	.....	.....
Canary Islands..... 1919	2,800	521,000	186	.....	.....
Sweden..... 1920	173,000	5,904,000	34	146,000,000	1,094,800,000
Switzerland..... 1920	15,900	3,880,000	244	100,000,000	883,200,000
Turkey in Europe..... 1920	10,900	1,891,000	173	42,000,000	.....
Ukraine..... 1920	174,500	26,002,000	149	.....	.....
ASIA.....	17,200,000	872,500,000	51	2,055,000,000	.....
Afghanistan..... 1918	245,000	6,381,000	26	.....	.....
Arabian Peninsula..... 1918	1,000,000	5,000,000	5	.....	.....
Aden..... 1921	9,000	55,000	6	.....	.....
Asir..... 1920	20,000	1,000,000	50	.....	.....
Hejaz..... 1920	100,000	750,000	8	.....	.....
Oman..... 1920	82,000	500,000	6	.....	.....
Yemen..... 1920	75,000	1,000,000	13	.....	.....
Remaining Territories..... 1920	700,000	1,750,000	2	.....	.....
Armenia (Soviet Republic)..... 1920	15,240	1,214,000	80	.....	.....
Azerbaijan (Soviet Republic)..... 1920	33,900	2,097,000	62	.....	.....
Baluchistan..... 1921	54,200	422,000	8	.....	.....
Burma..... 1921	230,800	13,206,000	58	.....	.....
Bhutan..... 1918	20,000	250,000	13	.....	.....
Ceylon..... 1921	25,500	4,498,000	177	.....	.....

COUNTRY.		AREA, SQ. M.	TOTAL POPULATION.	POP. PER SQ. M.	TRADE WITH U. S. 1920.	TOTAL IMPORTS AND EXPORTS.
ASIA—(Continued)						
Chinese Republic.....	1919	3,914,000	320,650,000	82	\$338,000,000	\$1,150,000,000
China proper.....	1919	1,532,000	302,110,000	197	.....	.....
Manchuria.....	1919	364,000	20,000,000	16	.....	.....
Mongolia.....	1919	1,368,000	1,800,000	1	.....	.....
Sinkiang.....	1919	550,000	2,000,000	4	.....	.....
Tibet.....	1919	463,000	2,000,000	4	.....	.....
Cyprus.....	1921	3,580	310,808	87	.....	.....
Dutch East Indies.....	1917	688,000	47,000,000	69	226,000,000	.....
Borneo.....	1917	212,700	1,514,000	7	.....	.....
Celebes.....	1917	72,100	3,094,000	43	.....	.....
Java.....	1917	50,600	34,157,000	675	.....	.....
New Guinea (see Islands of Pacific)						
Sumatra.....	1917	159,800	5,027,000	31	.....	.....
Other Islands.....	1917	239,800	3,207,000	13	.....	.....
Georgia.....	1915	32,800	3,053,000	93	.....	.....
Indian Empire.....	1921	1,802,600	319,075,000	177	276,000,000	1,150,000,000
Japanese Empire.....	1920	260,700	77,005,000	295	791,000,000	1,840,000,000
Japan proper.....	1920	148,800	55,961,000	376	.....	.....
Chosen (Korea).....	1920	84,700	17,284,000	204	3,000,000	.....
Sakhalin.....	1920	13,300	106,000	8	.....	.....
Taiwan (Formosa).....	1920	13,900	3,654,000	263	.....	.....
Malay Peninsula.....	1920	507,600	28,337,000	58	.....	.....
Federated Malay States.....	1919	27,500	1,280,000	47	.....	.....
Non-Federated States.....	1918	23,500	955,000	41	.....	.....
Straits Settlements.....	1919	1,600	846,000	529	210,000,000	.....
French Indo-China.....	1914	253,000	16,990,000	66	5,000,000	.....
Siam.....	1912	199,000	8,266,000	42	2,000,000	92,000,000
Mesopotamia.....	1920	143,300	2,849,000	20	.....	.....
Nepal.....	1918	54,000	5,600,000	104	.....	.....
Palestine.....	1921	9,000	770,000	86	.....	.....
Persia.....	1919	630,000	10,000,000	16	45,000,000	124,200,000
Philippine Islands.....	1920	115,026	10,607,872	92	213,000,000	300,000,000
Siberia.....	1920	4,210,400	9,258,000	2	.....	.....
Bokhara.....	1920	79,400	3,000,000	39	.....	.....
Khiva.....	1920	24,300	519,000	21	.....	.....
Steppes, The.....	1915	710,900	4,017,000	6	.....	.....
Syria.....	1920	65,000	3,000,000	46	.....	.....
Transcaspian Province.....	1915	235,100	553,000	2	.....	.....
Turkestan (Russian).....	1920	577,400	7,201,000	12	.....	.....
Turkey in Asia.....	1920	175,000	8,000,000	46	.....	.....
AUSTRALIA, NEW ZEALAND AND LARGER ISLANDS OF THE PACIFIC						
Australia.....	1921	2,975,000	5,437,000	2	165,000,000	690,000,000
Federal Territory.....	1921	940	2,570	3	.....	.....
New South Wales.....	1921	309,400	2,100,000	7	.....	.....
Northern Territory.....	1921	523,600	3,800	..	.....	.....
Queensland.....	1921	670,500	758,000	1	.....	.....
South Australia.....	1921	380,000	495,000	1	.....	.....
Tasmania.....	1921	26,200	214,000	8	.....	.....
Victoria.....	1921	87,800	1,532,000	17	.....	.....
West Australia.....	1921	975,900	332,000	..	.....	.....
Bismarck Archipelago.....	1913	20,000	188,000	9	.....	.....
Fiji Islands.....	1920	7,400	163,000	22	.....	.....
Guam.....	1920	210	13,275	63	.....	.....
Hawaiian Islands.....	1920	6,449	259,208	40	266,000,000	282,000,000
New Caledonia.....	1911	7,700	50,600	7	.....	.....
New Guinea (British).....	1919	90,500	350,000	3	.....	.....
New Guinea (Dutch).....	1919	152,000	200,000	1	.....	.....
New Hebrides.....	1920	5,500	60,000	11	.....	.....
New Zealand.....	1920	105,000	1,219,000	12	74,000,000	276,000,000
Samoan Islands.....	1920	1,277	45,100	35	225,000	324,000
American Samoa.....	1920	77	8,056	105	.....	.....
Western Samoa.....	1921	1,200	37,000	31	.....	.....
Solomon Islands.....	1921	11,000	150,000	14	.....	.....
Tonga (Friendly) Islands.....	1919	385	23,500	61	.....	.....
AFRICA.....		11,600,000	142,750,000	12	316,000,000	.....
Independent Countries:						
Abyssinia.....	1919	350,000	8,000,000	20	.....	.....
Liberia.....	1919	40,000	2,000,000	50	300,000	1,840,000

COUNTRY.		AREA, SQ. M.	TOTAL POPULATION.	POP. PER SQ. M.	TRADE WITH U. S. 1920.	TOTAL IMPORTS AND EXPORTS
AFRICA—(Continued)						
<i>Belgian Sphere of Influence:</i>						
Belgian Congo.....	1920	909,700	11,000,000	12	\$1,000,000	\$28,700,000
<i>British Sphere of Influence:</i>						
Anglo-Egyptian Sudan.....	1920	1,014,000	3,400,000	3	.....	.....
Basutoland.....	1921	11,700	498,000	43	.....	.....
Bechuanaland.....	1921	275,000	152,983	..	.....	.....
British East Africa.....	.....	721,300	9,898,000	..	9,000,000	.....
East African Protectorate...	.....	245,000	2,630 000	11	.....	.....
Pemba (Island).....	1910	380	83,000	218	.....	.....
Tanganyika Territory.....	1919	365,000	4,000,000	11	.....	.....
Uganda Territory.....	1920	110,300	3,072,000	28	.....	.....
Zanzibar (Island).....	1910	640	113,600	178	.....	.....
British Somaliland.....	1911	68,000	300,000	4	.....	.....
British West Africa.....	1920	447,500	20,652,000	46	34,000,000	.....
Gambia.....	1920	4,500	248,000	55	.....	.....
Egypt.....	1917	350,000	12,751,000	36	135,000,000	800,000,000
Gold Coast.....	1921	80,000	2,030,000	25	.....	.....
Kamerun (British and French)	1919	191,100	2,540,000	13	.....	.....
Nigeria.....	1920	332,000	16,250,000	49	.....	119,600,000
Sierra Leone.....	1911	4,000	75,600	19	.....	.....
Nyasaland.....	1921	39,600	1,203,000	30	.....	.....
Rhodesia.....	.....	440,000	1,736,000	4	.....	.....
Northern Rhodesia.....	1921	291,000	932,000	3	.....	.....
Southern Rhodesia.....	1921	149,000	804,000	5	.....	.....
Southwest Africa.....	1921	322,400	237,000	..	.....	.....
Swaziland.....	1921	6,700	134,000	20	.....	.....
Togoland (British and French)	1913	33,700	1,032,000	31	.....	.....
Union of South Africa.....	1921	473,200	6,923,000	15	81,000,000	473,800,000
Cape of Good Hope.....	1921	277,000	2,781,000	10	.....	.....
Natal.....	1911	35,300	1,428,000	34	.....	.....
Orange Free State.....	1921	50,400	628,000	12	.....	.....
Transvaal.....	1921	110,500	2,086,000	19	.....	.....
<i>French Sphere of Influence:</i>						
Algeria.....	1921	222,200	5,800,000	26	.....	.....
French Equatorial Africa.....	1915	982,000	6,370,000	7	.....	.....
French Somali Coast.....	1921	5,800	65,000	11	.....	.....
French West Africa and Sahara	1921	1,800,500	12,284,000	6	.....	.....
Colony of the Upper Volta..	1921	154,400	2,974,000	19	.....	.....
Dahomey.....	1921	42,400	842,000	20	.....	.....
French Guinea.....	1921	95,200	1,876,000	20	.....	.....
French Sudan.....	1921	617,600	2,475,000	4	.....	.....
Ivory Coast.....	1921	122,000	1,546,000	13	.....	.....
Mauretania.....	1921	347,400	262,000	..	.....	.....
Senegal.....	1921	74,100	1,226,000	17	.....	.....
Upper Niger Territory.....	1921	347,400	1,084,000	3	.....	.....
Kamerun (see British)	.....	.....	.....	.....	.....	.....
Madagascar.....	1917	228,000	3,545,000	16	2,500,000	52,000,000
Morocco.....	1917	221,000	5,400,000	24	6,000,000	.....
Togoland (see British)	.....	.....	.....	.....	.....	.....
Tunis.....	1921	50,000	2,094,000	42	.....	.....
<i>Italian Sphere of Influence:</i>						
Eritrea.....	1920	45,800	406,000	9	.....	.....
Italian Somaliland.....	1915	139,400	650,000	5	.....	.....
Libia.....	1911	406,000	523,000	1	.....	.....
<i>Portuguese Sphere of Influence:</i>						
Angola (Portuguese West Africa)	1918	484,800	4,119,000	8	.....	.....
Mozambique.....	1918	426,700	3,120,000	7	.....	.....
Portuguese Guinea.....	1917	13,900	289,000	21	.....	.....
<i>Spanish Sphere of Influence:</i>						
Río de Oro.....	1920	109,200	500	..	.....	.....
Spanish Guinea.....	1920	9,500	200,000	21	.....	.....
Spanish Morocco.....	1920	7,700	600,000	78	.....	.....

II. AREA AND POPULATION OF THE UNITED STATES AND ITS POSSESSIONS, AND OCCUPATIONS OF PEOPLE IN THE VARIOUS STATES.

NOTE TO TEACHER.—Attention is called to the fact that these figures are shown in abbreviated form. This is valuable for two reasons. It enables us to get figures close together for purposes of comparison, and it gives a needed opportunity to familiarize the student with one of the usual forms of showing figures. There should be some drill to be sure that pupils understand what each column of figures really means. In examining the figures for manufactures, it should be remembered that this was a period of high prices due to the war, and that the manufacturer does not create all of this value, because he has to use many expensive raw materials.

It is better to measure the value of agriculture and manufacturing by the number of people supported than by the value of the products reported in the census.

In examining the figures for agriculture we must remember that the farm family uses many things produced on the farm. (U. S. census 1920.)

STATE.	Land Area, Sq. Miles, 1920.	Population per Sq. Mile in 1920.	Population in 1910 in Thousands.	Population in 1920 in Thousands.	Distribution of Persons Over 10 Years of Age in Gainful Occupations, by States, 1920.				Value* of All Farm Crops in 1919, Million Dollars.	Value of Manufactured Products, 1919, (Preliminary Statistics of Census Bureau). Million Dollars.
					Total Persons Occupied in Thousands.	Percentage of Total for Each Occupational Class.	Percentage of Total for Each Occupational Class.	Percentage of Total for Each Occupational Class.		
						Agriculture, Forestry and Animal Husbandry.	Manufacturing and Mechanical Industries.	Extraction of Minerals.		
Alabama.....	51,279	45.8	2,348	2,138	908	56	17	4	304	493
Arizona.....	113,810	2.9	334	204	131	28	18	12	42	121
Arkansas.....	52,525	33.4	1,752	1,574	635	64	12	1	341	200
California.....	155,652	22.0	3,426	2,377	1,511	18	23	2	590	1,981
Colorado.....	103,658	9.1	939	799	366	27	20	6	181	276
Connecticut.....	4,820	286.4	1,380	1,114	590	6	54	..	44	1,392
Delaware.....	1,965	113.5	223	202	91	19	38	..	23	165
Dist. of Columbia.....	60	7,292.9	437	331	236	..	19	..	..	69
Florida.....	54,861	17.7	968	752	385	32	26	1	80	213
Georgia.....	58,725	49.3	2,895	2,609	1,129	54	16	..	541	693
Idaho.....	83,354	5.2	431	325	153	48	16	3	126	81
Illinois.....	56,043	115.7	6,485	5,638	2,627	14	33	3	865	5,425
Indiana.....	36,045	81.3	2,930	2,700	1,117	26	34	3	497	1,899
Iowa.....	55,586	43.2	2,404	2,224	859	38	21	2	890	745
Kansas.....	81,774	21.6	1,769	1,690	624	37	20	3	589	914
Kentucky.....	40,181	60.1	2,416	2,289	851	46	17	6	347	396
Louisiana.....	45,409	39.6	1,798	1,656	681	43	20	1	206	676
Maine.....	29,895	25.7	768	742	310	25	39	..	100	457
Maryland.....	9,941	145.8	1,449	1,295	603	16	33	1	110	874
Massachusetts.....	8,039	479.2	3,852	3,366	1,728	3	51	..	54	4,011
Michigan.....	57,480	63.8	3,668	2,810	1,474	20	42	2	404	3,466
Minnesota.....	80,858	29.5	2,387	2,075	907	34	22	2	506	1,218
Mississippi.....	46,362	38.6	1,790	1,797	721	70	10	..	336	198
Missouri.....	68,727	49.5	3,404	3,293	1,317	30	25	2	559	1,599
Montana.....	146,201	3.8	548	376	214	40	15	8	70	167
Nebraska.....	76,808	16.9	1,296	1,192	457	41	18	1	520	596
Nevada.....	109,821	0.7	77	81	38	23	19	16	14	23
New Hampshire.....	9,031	49.1	443	430	193	16	51	..	24	407
New Jersey.....	7,514	420.0	3,155	2,537	1,310	5	48	..	87	3,676
New Mexico.....	122,503	2.9	360	327	122	45	13	6	41	18
New York.....	47,654	217.9	10,385	9,113	4,505	7	39	..	417	8,867
North Carolina.....	48,740	52.5	2,559	2,206	896	53	24	..	503	944
North Dakota.....	70,183	9.2	646	577	207	58	9	1	302	57
Ohio.....	40,740	141.4	5,759	4,767	2,300	16	42	3	607	5,100
Oklahoma.....	69,414	29.2	2,028	1,657	681	41	15	6	550	401
Oregon.....	95,607	8.2	783	672	322	29	27	1	132	367
Pennsylvania.....	44,832	194.5	8,720	7,665	3,426	8	42	10	410	7,317
Rhode Island.....	1,067	566.4	604	542	275	3	59	..	5	747
South Carolina.....	30,495	55.2	1,683	1,515	674	62	16	..	437	381
South Dakota.....	76,868	8.3	636	583	217	54	12	1	311	62
Tennessee.....	41,687	56.1	2,337	2,184	830	48	18	2	318	556
Texas.....	262,398	17.8	4,663	3,896	1,719	46	16	2	1,072	1,000
Utah.....	82,184	5.5	449	373	149	29	23	7	58	157
Vermont.....	9,124	38.6	352	355	138	32	32	1	48	168
Virginia.....	40,262	57.4	2,309	2,061	833	36	24	2	293	644
Washington.....	66,836	20.3	1,356	1,141	578	23	31	2	227	810
West Virginia.....	24,022	60.9	1,463	1,221	491	26	24	21	97	472
Wisconsin.....	55,256	47.6	2,632	2,333	100	31	34	..	445	1,847
Wyoming.....	97,594	2.0	194	145	82	32	19	11	30	81
United States (Continental).....	2,973,890	35.5	105,710	91,972	41,609	26	31	3	14,755	62,428

* Value of all farm crops is expressed in millions. Amounts of \$500,000 and over are counted as another unit.

II. AREA AND POPULATION OF THE UNITED STATES AND ITS POSSESSIONS—(Continued)

STATE. OUTLYING POSSESSIONS	AREA, SQ. MILES.	POPULATION IN 1920.	POPULATION IN 1910.	POP. PER SQ. MILE IN 1920.
Alaska.....	590,884	54,899	64,356	0.1
American Samoa.....	77	8,056	.....	104.6
Guam.....	210	13,275	.....	63.2
Hawaii.....	6,449	259,208	191,909	40.2
Panama Canal Zone.....	436	21,650	.....	50.1
Philippine Islands.....	115,026	10,607,872	.....	92.2
Porto Rico.....	3,435	1,309,172	1,118,012	380.5
Soldiers, etc., abroad.....	.....	117,238	55,608	.....
Virgin Islands.....	149	26,051	.....	174.8
Total land and water area, United States and possessions	3,743,455	118,010,803	93,402,151	31.1

III. THE WORLD'S GREATEST SEAPORTS.

Figures are for 1919 or the latest available. Trade is calculated on the basis of \$4.60 to the pound sterling.

In examining these figures several things are to be noticed. One is that some ports have a very large tonnage, or amount of shipping entered and cleared, because they are ports of call. Thus vessels make London and Liverpool their chief port, often their only port, but vessels from many North Sea ports stop at Antwerp on the way out to the Atlantic. Singapore, Shanghai, Yokohama, Rio Janeiro, and Montevideo are also ports of call. Cardiff has low value of trade because her chief trade is the export of coal, the cheapest important commodity in trade. Figures for cities in the United States are for customs districts.

CITY	TONS ENTERED.	TONS CLEARED.	TRADE VALUE.	CITY.	TONS ENTERED.	TONS CLEARED.	TRADE VALUE.
Liverpool....	7,159,000	6,658,000	\$3,844,909,000	Kobé.....	5,335,000	5,182,000	\$463,073,000
London.....	7,745,000	5,335,000	3,771,426,000	New Orleans..	3,153,000	3,068,000	458,846,000
New York... ..	10,943,000	10,548,000	3,554,880,000	Calcutta.....	1,390,000	1,715,000	442,805,000
Hamburg.....	12,997,000	13,192,000	1,749,472,000	San Francisco	1,173,000	1,364,000	442,818,000
Antwerp.....	13,757,000	13,722,000	1,114,437,000	Yokohama....	3,456,000	3,359,000	437,239,000
Marseille....	5,299,000	3,402,000	757,206,000	Singapore....	6,602,000	6,612,000	422,400,000
Hull.....	1,979,052	1,474,034	680,906,000	Puenos Aires.	3,909,000	.....	418,397,000
Manchester..	1,240,000	839,606	675,697,000	Pordeaux....	2,824,000	1,014,000	396,267,000
Montreal....	1,898,000	1,961,000	670,854,000	Shanghai....	7,810,000	7,906,000	381,845,000
Washington..	3,350,000	3,296,000	538,190,000	Pombay.....	1,698,000	1,451,000	366,772,000
Bremen.....	1,511,000	1,506,000	535,716,000	Sydney.....	1,079,000	1,102,000	362,986,000
Glasgow.....	1,927,780	2,961,790	507,144,000	Alexandria...	967,000	1,344,000	261,464,000
Philadelphia.	1,965,000	2,118,000	500,250,000	Rio de Janeiro	3,067,000	3,031,000	150,226,000
Havre.....	2,642,000	1,112,000	498,290,000	Cardiff.....	5,599,000	6,163,000	142,515,000
Genoa.....	5,335,000	5,119,000	457,852,000	Montevideo..	6,489,000	6,473,000	89,824,000

IV. TABLE OF OCEAN DISTANCES. From leading U. S. ports to all parts of the world.

	MILES		
New York to—		Liverpool.....	4,715
Liverpool.....	3,053	Gibraltar.....	4,783
Gibraltar.....	3,207	Colon to—	
St. Vincent (Cape Verde)	3,202	Panama.....	47
Cape Town.....	6,815	Panama to—	
Barbados.....	1,829	Valparaiso.....	2,608
Pernambuco.....	3,696	San Francisco.....	3,277
Rio de Janerio.....	4,778	Honolulu.....	4,605
Montevideo.....	5,834	Tahiti (Society Islands).	4,530
San Juan, P. R.....	1,428	Wellington.....	6,512
Colon.....	1,981	Gibraltar to—	
Havana.....	1,227	Plymouth.....	1,060
Boston to—		Port Said.....	1,920
Liverpool.....	2,872	Port Said to—	
Montreal to—		Suez.....	103
Liverpool.....	2,872	Suez to—	
Port Nelson to—		Aden.....	1,310
Liverpool.....	3,000	Aden to—	
New Orleans to—		Bombay.....	1,640
Colon.....	1,380	Colombo.....	2,130
Havana.....	5,970	Hobart.....	6,600
Newport News.....	1,741	Mauritius.....	2,340
Liverpool.....	4,553	Zanzibar.....	1,770
Gibraltar.....	4,576	Cape Town to—	
Galveston to—		Mozambique.....	1,850
Colon.....	1,481	Mauritius.....	2,290
Havana.....	765	Melbourne.....	6,030
New York.....	1,992	Wellington.....	6,769
		Colombo to—	
		Melbourne.....	4,730
		Sunda Strait.....	1,770
		Singapore.....	1,560
		Calcutta.....	1,220
		Rangoon.....	1,200
		San Francisco to—	
		Seattle.....	775
		Cape Nome.....	2,771
		Honolulu.....	2,100
		Yokohama.....	4,791
		Honolulu to—	
		Yokohama.....	3,445
		Midway.....	1,160
		Guam.....	3,337
		Samoa.....	2,240
		Sydney.....	4,594
		Yokohama to—	
		Shanghai.....	1,050
		Hong Kong.....	1,590
		Manila.....	1,753
		Singapore to—	
		Hong Kong.....	1,440
		Manila.....	1,386
		Bangkok.....	830
		Calcutta.....	1,630
		Colombo.....	1,560

Distance saved by Panama Canal for vessel going from New York to San Francisco, 7,873 miles.

V. CITIES IN THE UNITED STATES HAVING A POPULATION OF 100,000 AND OVER.

CITY.	POPULATION, 1920.	CITY.	POPULATION, 1920.	CITY.	POPULATION, 1920.
New York, N. Y.	5,620,048	Portland, Ore.	258,288	Scranton, Pa.	137,783
Chicago, Ill.	2,701,705	Denver, Colo.	256,491	Grand Rapids, Mich.	137,634
Philadelphia, Pa.	1,823,779	Toledo, Ohio.	243,164	Paterson, N. J.	135,875
Detroit, Mich.	993,678	Providence, R. I.	237,595	Youngstown, Ohio.	132,358
Cleveland, Ohio.	796,841	Columbus, Ohio.	237,031	Springfield, Mass.	129,614
St. Louis, Mo.	772,897	Louisville, Ky.	234,891	Des Moines, Iowa.	126,468
Boston, Mass.	748,060	St. Paul, Minn.	234,698	New Bedford, Mass.	121,217
Baltimore, Md.	733,826	Oakland, Calif.	216,261	Fall River, Mass.	120,485
Pittsburgh, Pa.	588,343	Akron, Ohio.	208,435	Trenton, N. J.	119,289
Los Angeles, Calif.	576,673	Atlanta, Ga.	200,616	Nashville, Tenn.	118,342
Buffalo, N. Y.	506,775	Omaha, Neb.	191,601	Salt Lake City, Utah.	118,110
San Francisco, Calif.	506,676	Worcester, Mass.	179,754	Camden, N. J.	116,309
Milwaukee, Wis.	457,147	Birmingham, Ala.	178,806	Norfolk, Va.	115,777
Washington, D. C.	437,571	Syracuse, N. Y.	171,717	Albany, N. Y.	113,544
Newark, N. J.	414,524	Richmond, Va.	171,667	Lowell, Mass.	112,759
Cincinnati, Ohio.	401,247	New Haven, Conn.	162,537	Wilmington, Del.	110,168
New Orleans, La.	387,219	Memphis, Tenn.	162,351	Cambridge, Mass.	109,694
Minneapolis, Minn.	380,582	San Antonio, Tex.	161,379	Reading, Pa.	107,784
Kansas City, Mo.	324,410	Dallas, Tex.	158,976	Fort Worth, Tex.	106,482
Seattle, Wash.	315,812	Dayton, Ohio.	152,559	Spokane, Wash.	104,437
Indianapolis, Ind.	314,194	Bridgeport, Conn.	143,555	Kansas City, Kan.	101,177
Jersey City, N. J.	298,103	Houston, Tex.	138,276	Yonkers, N. Y.	100,176
Rochester, N. Y.	295,750	Hartford, Conn.	138,036		

VI. ELEVATION, LOCATION, AND POPULATION OF CITIES OF THE UNITED STATES AND ITS POSSESSIONS HAVING A POPULATION OF 20,000 OR OVER, INCLUDING THE CAPITAL AND LARGEST CITY OF EACH STATE. ELEVATIONS WERE KINDLY FURNISHED BY THE U. S. GEOLOGICAL SURVEY.

	ALT.	N.°	W.°	1920	1910 (Thous.)		ALT.	N.°	W.°	1920	1910 (Thous.)
Aberdeen, Wash...	10	47.0	123.9	15,337	14	Bayonne, N. J....	10	40.6	74.1	76,754	56
Akron, Ohio.....	1080	41.	81.5	208,435	69	Beaumont, Tex....	24	30.	94.2	40,422	21
Alameda, Calif....	262	37.7	122.7	28,806	23	Belleville, N. J....	264	40.8	74.1	15,660	..
Albany, N. Y.....	140	42.7	73.8	113,544	100	Bellevue, Ill.....	480	38.5	90.0	24,823	21
Albuquerque, N.M.	4954	35.1	107.4	15,157	11	Bellingham, Wash.	100	48.6	122.5	25,585	24
Alexandria, La....	77	31.3	92.5	17,510	11	Beloit, Wis.....	743	42.5	89.	21,284	15
Alexandria, Va....	33	38.8	77.0	18,060	15	Berkeley, Calif....	600	37.8	122.3	56,036	40
Allentown, Pa....	321	40.6	75.5	73,502	52	Berlin, N. H.....	1013	44.5	71.2	16,104	12
Alliance, Ohio....	1040	40.9	81.1	21,603	15	Bessemer, Ala....	512	33.4	87.0	18,674	11
Alton, Ill.....	578	38.8	90.1	24,682	18	Bethlehem, Pa....	300	40.6	75.4	50,358	13
Altoona, Pa.....	1181	40.5	78.4	60,331	52	Beverly, Mass....	100	42.6	70.8	22,561	19
Amarillo, Tex....	3667	35.2	101.7	15,494	10	Biddeford, Me....	75	43.5	70.5	18,008	17
Amsterdam, N. Y.	276	42.9	74.1	33,524	31	Binghamton, N. Y.	866	42.1	75.9	66,800	48
Anderson, Ind....	874	40.1	85.8	29,767	22	Birmingham, Ala.	610	35.5	86.8	178,806	133
Annapolis, Md....	23	38.9	76.6	11,214	9	Bismarck, N. D....	1672	46.7	100.9	7,122	5
Ann Arbor, Mich..	843	42.3	83.7	19,516	15	Bloomfield, N. J..	182	40.7	74.2	22,019	15
Anniston, Ala....	709	33.7	85.8	17,734	13	Bloomington, Ill..	830	40.5	89.	28,725	26
Ansonia, Conn....	31	41.3	73.1	17,643	15	Bluefield, W. Va..	2558	37.3	81.2	15,282	11
Appleton, Wis....	790	44.3	88.4	19,561	17	Boise, Idaho.....	2700	43.6	116.3	21,393	17
Arlington, Mass....	46	42.4	71.1	18,665	11	Boston, Mass.....	100	42.3	71.1	748,060	670
Asheville, N. C....	2208	35.5	82.5	28,504	19	Braddock, Pa....	1200	40.4	79.8	20,879	19
Ashtabula, Ohio...	700	41.8	81.9	22,082	18	Bradford, Pa....	859	42.0	78.7	15,525	15
Athens, Ga.....	705	34.0	83.4	16,748	15	Bridgeport, Conn..	40	41.2	73.2	143,555	102
Atlanta, Ga.....	1050	33.7	84.4	200,616	155	Bristol, Conn....	400	41.6	72.9	20,620	10
Atlantic City, N. J.	10	39.4	74.4	50,707	46	Brockton, Mass...	130	42.1	71.	66,254	57
Attleboro, Mass....	137	41.9	71.3	19,731	16	Brookline, Mass...	200	42.3	71.1	37,748	28
Auburn, Me.....	148	44.1	70.3	16,985	15	Buffalo, N. Y....	572	42.9	78.9	506,775	424
Auburn, N. Y.....	709	42.9	76.5	36,192	35	Burlington, Iowa..	542	40.8	91.1	24,057	24
Augusta, Ga.....	134	33.4	82.	52,548	41	Burlington, Vt....	109	44.5	73.3	22,779	20
Augusta, Me.....	153	44.3	69.7	14,114	13	Butler, Pa.....	1077	40.8	79.8	23,778	21
Aurora, Ill.....	647	41.7	88.2	36,397	30	Butte, Mont.....	5769	46.	112.5	41,611	39
Austin, Tex.....	502	30.1	92.7	34,876	30	Cairo, Ill.....	327	37.0	89.2	15,203	15
Bakersfield, Calif.	400	35.4	119.0	18,638	13	Cambridge, Mass..	140	42.4	71.1	109,694	105
Baltimore, Md....	70	39.3	76.6	733,826	558	Camden, N. J.....	31	39.9	75.1	116,309	95
Bangor, Me.....	24	44.8	68.8	25,978	25	Canton, Ohio.....	1080	40.7	81.4	87,091	50
Barberton, Ohio...	968	41.0	81.5	18,811	9	Carbondale, Pa....	1069	41.6	75.5	18,640	17
Baton Rouge, La..	60	30.4	91.1	21,782	15	Carson City, Nev..	4678	39.1	119.5	1,685	2
Battle Creek, Mich.	824	42.2	85.2	36,164	25	Cedar Rapids, Iowa	732	42.	91.6	45,566	33
Bay City, Mich....	586	43.5	83.8	47,554	45	Central Falls, R. I.	100	41.9	71.4	24,174	23

CITIES OF THE UNITED STATES AND ITS POSSESSIONS, ETC. (Continued)

	Alt.	N.°	W.°	1920	1910 (Thous.)		Alt.	N.°	W.°	1920	1910 (Thous.)
Champaign, Ill....	738	40.2	88.2	15,873	12	Everett, Mass.....	100	42.4	71.1	40,120	33
Charleston, S. C....	15	32.8	80.	67,957	59	Everett, Wash.....	150	42.4	122.3	27,644	25
Charleston, W. Va.	601	33.4	81.7	39,608	23	Fairmont, W. Va..	883	39.5	80.2	17,851	10
Charlotte, N. C....	759	35.2	80.8	46,338	34	Fall River, Mass...	200	42.7	71.1	120,485	119
Charlotte Amalie, Virgin Islands...	10	18.0	64.7	7,747	...	Fargo, N. Dak....	906	46.9	96.9	21,961	14
Chattanooga, Tenn.	693	35.	85.2	57,895	45	Farrell, Pa.....	945	41.2	80.5	15,586	10
Chelsea, Mass.....	100	42.4	71.	43,184	32	Findlay, Ohio....	780	41.0	83.6	17,021	15
Chester, Pa.....	40	39.8	75.4	58,030	39	Fitchburg, Mass...	600	42.6	71.8	41,029	38
Cheyenne, Wyo....	6060	41.2	104.8	13,829	11	Flint, Mich.....	733	43.	83.6	91,599	39
Chicago, Ill.....	598	41.8	87.6	2,701,705	2,185	Fond du Lac, Wis..	764	43.8	88.4	23,427	19
Chicago Heights, Ill.	684	41.5	87.6	19,653	15	Fort Dodge, Iowa.	1011	42.5	94.2	19,347	16
Chicopee, Mass....	180	42.2	72.6	36,214	25	Fort Smith, Ark...	448	35.4	94.5	28,870	24
Chillicothe, Ohio..	643	39.3	83.0	15,831	15	Fort Wayne, Ind..	780	41.1	85.1	86,549	64
Cicero, Ill.....	...	41.8	87.7	44,995	15	Fort Worth, Tex...	619	32.7	97.2	106,482	73
Cincinnati, Ohio..	553	39.1	84.5	401,247	364	Framingham, Mass.	199	42.3	71.5	17,033	13
Clarksburg, W. Va.	1007	39.3	80.4	27,869	9	Frankfort, Ky.....	511	38.1	84.5	9,805	10
Cleveland, Ohio...	669	41.4	81.8	796,841	561	Freeport, Ill.....	780	42.3	89.6	19,669	18
Cleveland Heights, Ohio.....	900	41.5	81.7	15,236	3	Fresno, Calif.....	290	36.7	119.7	45,086	25
Clifton, N. J.....	66	40.7	74.1	26,470	12	Galesburg, Ill....	789	40.9	90.4	23,834	22
Clinton, Iowa.....	590	41.8	90.2	24,151	26	Galveston, Tex....	10	29.3	94.9	44,255	37
Cohoes, N. Y.....	192	42.7	73.8	22,987	25	Gardner, Mass....	1030	42.6	72.0	16,971	15
Colorado Springs, Colo.....	5982	38.8	104.8	30,105	29	Garfield, N. J....	60	40.9	74.1	19,381	10
Columbia, S. C....	315	33.9	81.	37,524	26	Gary, Ind.....	581	41.5	87.5	55,378	17
Columbus, Ga.....	250	32.4	84.9	31,125	21	Glens Falls, N. Y..	150	43.3	73.6	16,638	15
Columbus, Ohio...	780	40.	83.	237,031	182	Gloucester, Mass..	80	42.6	70.6	22,947	24
Concord, N. H....	228	43.2	71.6	22,167	21	Gloversville, N. Y.	798	43.	74.3	22,075	21
Corning, N. Y.....	936	42.1	77.1	15,820	14	Grand Rapids, Mich.	654	43.	85.6	137,634	113
Council Bluffs, Iowa	994	41.2	95.8	36,162	29	Great Falls, Mont.	3332	47.4	111.4	24,121	14
Covington, Ky....	513	39.	84.4	57,121	53	Green Bay, Wis....	591	44.5	88.	31,017	25
Cranston, R. I....	80	41.8	71.4	29,407	21	Greenfield, Mass...	204	42.6	72.6	15,462	10
Cumberland, Md...	687	39.7	78.8	29,837	22	Greensboro, N. C..	836	36.1	79.8	19,861	16
Dallas, Tex.....	434	32.6	96.8	158,976	92	Greenville, S. C...	970	34.8	82.4	23,127	16
Danbury, Conn....	371	41.4	73.5	18,943	20	Hackensack, N. J..	14	40.9	74.1	17,667	14
Danville, Ill.....	603	40.1	87.6	33,776	28	Hagerstown, Md...	522	39.6	77.7	28,064	17
Danville, Va.....	408	36.5	79.4	21,539	19	Hamilton, Ohio...	605	39.3	84.5	39,675	35
Davenport, Iowa...	592	41.5	90.6	56,727	43	Hammond, Ind....	590	41.6	87.5	36,004	21
Dayton, Ohio.....	743	39.7	84.2	152,559	117	Hamtramck, Mich.	630	42.3	83.	48,615	4
Decatur, Ill.....	632	39.8	88.9	43,818	31	Hannibal, Mo....	489	39.7	91.4	19,306	18
Denison, Tex.....	757	33.8	96.5	17,065	14	Harrisburg, Pa....	357	40.2	76.9	75,917	64
Denver, Colo.....	5278	39.7	105.	256,491	213	Harrison, N. J....	38	40.7	74.2	15,721	14
Des Moines, Iowa.	807	41.5	93.5	126,468	86	Hartford, Conn....	40	41.8	72.7	138,036	99
Detroit, Mich....	584	42.3	83.	993,678	466	Haverhill, Mass...	100	42.7	71.	53,884	44
Dover, Del.....	34	39.1.	75.6	4,042	4	Hazleton, Pa.....	1600	41.	76.	32,277	25
Dubuque, Iowa...	874	42.5	90.7	39,141	38	Helena, Mont....	4111	46.5	112.	12,037	13
Duluth, Minn....	606	46.9	92.4	98,917	78	Highland Park, Mich.....	639	42.3	83.1	46,499	4
Dunkirk, N. Y....	680	42.5	79.4	19,336	17	Hoboken, N. J....	260	40.7	74.	68,166	70
Dunmore, Pa.....	1000	41.4	75.6	20,250	18	Holyoke, Mass....	200	42.2	72.6	60,203	58
Duquesne, Pa....	935	40.4	79.8	19,011	16	Homestead, Pa....	761	40.4	79.9	20,452	19
Durham, N. C....	405	36.	79.	21,719	18	Honolulu, Hawaii.	10	21.4	157.9	83,327	52
East Chicago, Ind.	581	41.6	87.5	35,967	19	Houston, Tex.....	61	29.7	95.5	138,276	79
East Cleveland, O.	660	41.4	81.5	27,292	9	Huntington, W. Va.	564	38.5	82.5	50,177	31
East Liverpool, O.	731	40.6	81.	21,411	20	Hutchinson, Kans.	1530	38.	97.9	23,298	16
Easton, Pa.....	364	40.7	75.3	33,813	29	Indianapolis Ind..	720	39.7	85.1	314,194	234
East Orange, N. J.	182	40.7	74.2	50,710	34	Ironwood, Mich...	1506	46.4	90.2	15,739	13
E. Providence, R. I.	100	41.8	71.4	21,793	16	Irrington, N. J....	160	40.7	74.2	25,480	12
East St. Louis, Ill.	414	38.6	90.1	66,767	59	Ithaca, N. Y.....	815	42.4	76.5	17,004	15
Eau Claire, Wis...	797	44.8	91.5	20,906	18	Jackson, Mich....	947	42.2	84.4	48,374	31
Elgin, Ill.....	745	42.	88.2	27,454	26	Jackson, Miss....	297	32.2	90.	22,817	21
Elizabeth, N. J....	38	40.5	74.3	95,783	73	Jacksonville, Fla...	11	29.6	81.6	91,558	58
Elkhart, Ind.....	754	41.8	86.1	24,277	19	Jamestown, N. Y..	1311	42.1	79.2	38,917	31
Elmira, N. Y.....	859	42.1	76.8	45,393	37	Janesville, Wis...	803	42.7	89.0	18,293	14
El Paso, Tex.....	3710	31.7	105.9	77,560	39	Jefferson City, Mo.	627	38.5	92.1	14,490	12
Elyria, Ohio.....	721	41.3	82.1	20,474	15	Jersey City, N. J.	101	40.6	74.1	298,103	268
Enid, Okla.....	1247	36.4	97.9	16,576	14	Johnstown, Pa....	1180	40.3	79.	67,327	55
Erie, Pa.....	800	42.1	80.2	93,372	67	Joliet, Ill.....	545	41.5	88.1	38,442	35
Evanston, Ill.....	602	42.	87.6	37,234	25	Joplin, Mo.....	1008	37.	94.5	29,902	32
Evansville, Ind...	394	38.	87.5	85,264	70	Juneau, Alaska...	10	58.4	134.5	3,058	2
						Kalamazoo, Mich..	793	42.3	85.5	48,487	39
						Kansas City, Kans.	753	39.1	94.7	101,177	82

APPENDIX

15

CITIES OF THE UNITED STATES AND ITS POSSESSIONS, ETC. (Continued)

	ALT.	N.°	W.°	1920	1910		ALT.	N.°	W.°	1920	1910
					(Thous.)						(Thous.)
Kansas City, Mo..	766	39.1	94.6	324,410	248	Muscatine, Iowa..	552	41.4	91.0	16,068	16
Kearny, N. J.	111	40.7	74.2	26,724	19	Muskegon, Mich..	589	43.2	86.1	36,570	24
Kenosha, Wis.	607	42.6	88.8	40,472	21	Muskogee, Okla..	612	35.7	95.3	30,277	25
Key West, Fla.	10	24.6	81.8	18,749	20	Nanticoke, Pa.	560	41.2	76.1	22,614	19
Kingston, N. Y.	224	41.9	74.	26,688	26	Nashua, N. H.	168	42.8	71.5	28,379	26
Knoxville, Tenn....	932	35.9	84.	77,818	36	Nashville, Tenn....	497	36.	86.8	118,342	110
Kokomo, Ind.	813	40.5	86.2	30,067	17	New Albany, Ind..	464	38.2	85.8	22,992	21
Lackawanna, N. Y.	600	42.8	78.9	17,918	15	Newark, N. J.	235	40.7	74.1	414,524	347
La Crosse, Wis.	580	43.8	91.1	30,421	30	Newark, Ohio.	836	40.	82.5	26,718	25
Lafayette, Ind.	594	40.4	86.9	22,486	20	New Bedford, Mass.	100	41.6	70.9	121,217	97
La Grange, Ga.	789	33.0	85.0	17,038	6	New Britain, Conn.	300	41.7	72.8	59,316	44
Lakewood, Ohio....		41.4	81.8	41,732	15	New Brunswick,					
Lancaster, Pa.	367	40.	76.3	53,150	47	N. J.	71	40.5	74.5	32,779	23
Lansing, Mich.	844	42.6	84.5	57,327	31	Newburgh, N. Y. ...	94	41.5	74.	30,366	28
Laredo, Tex.	438	27.4	99.5	22,710	15	New Castle, Pa.	806	41.	80.2	44,938	36
Lawrence, Mass.	100	42.7	71.1	94,270	86	New Haven, Conn.	40	41.2	72.9	162,537	134
Leavenworth, Kan.	769	39.3	95.0	16,912	19	New London, Conn.	100	41.3	72.1	25,688	20
Lebanon, Pa.	474	40.4	76.5	24,643	19	New Orleans, La. ...	5	29.9	90.1	387,219	339
Leominster, Mass..	404	42.5	71.7	19,744	18	Newport, Ky.	512	39.	84.3	29,317	30
Lewiston, Me.	196	44.1	70.2	31,791	26	Newport, R. I.	100	41.5	71.2	30,255	27
Lexington, Ky.	947	38.	84.3	41,534	35	Newport News, Va.	22	36.9	76.5	35,596	20
Lima, Ohio.	877	40.7	84.1	41,326	31	New Rochelle, N. Y.	100	40.9	73.8	36,213	29
Lincoln, Neb.	1,140	40.7	96.6	54,948	44	Newton, Mass.	80	42.3	71.2	46,054	40
Little Rock, Ark. ...	288	34.7	92.2	65,142	46	New York, N. Y. ...	36	40.8	73.9	5,620,048	4,767
Lockport, N. Y.	570	43.2	78.7	21,308	18	Niagara Falls, N. Y.	603	43.1	79.	50,760	30
Logansport, Ind.	592	40.7	86.2	21,626	19	Norfolk, Va.	15	36.8	76.3	115,777	67
Long Beach, Calif.	10	33.8	118.1	55,593	18	Norristown, Pa.	83	40.1	75.4	32,319	28
Lorain, Ohio.	959	41.4	82.2	37,295	29	N. Adams, Mass.	800	42.6	73.1	22,282	22
Los Angeles, Calif.	339	34.	118.2	576,673	319	Northampton, Mass.	200	42.3	72.6	21,951	19
Louisville, Ky.	463	38.2	85.5	234,891	224	North Tonawanda,					
Lowell, Mass.	140	42.6	71.4	112,759	106	N. Y.	580	43.0	78.9	15,482	12
Lynchburg, Va.	531	37.4	79.2	30,070	29	Norwalk, Conn.	100	41.1	73.4	27,743	24
Lynn, Mass.	160	42.4	70.9	99,148	89	Norwich, Conn.	200	41.5	72.1	29,685	28
McKeesport, Pa.	750	40.4	79.8	46,781	43	Norwood, Ohio.	600	39.2	84.5	24,966	16
McKees Rocks, Pa.	725	40.5	80.1	16,713	15	Oakland, Calif.	10	37.7	122.2	216,261	150
Macon, Ga.	334	32.8	83.6	52,995	41	Oak Park, Ill.	630	41.8	87.8	39,853	19
Madison, Wis.	924	43.	89.4	38,378	26	Ogden, Utah.	4,300	41.2	112.	32,804	26
Mahanoy, Pa.	1,231	40.8	76.1	15,599	16	Oil City, Pa.	1,009	41.4	79.8	21,274	16
Malden, Mass.	100	42.4	71.1	49,103	44	Oklahoma City,					
Manchester, N. H. ...	224	43.	71.5	78,384	70	Okla.	1,199	35.4	97.6	91,295	64
Manila, P. I.	10	14.6	121.0	283,613	234	Okmulgee, Okla. ...	650	35.6	96.0	17,430	4
Manitowoc, Wis.	592	44.1	87.7	17,563	13	Olean, N. Y.	1,452	42.1	78.4	20,506	15
Mansfield, Ohio.	1,237	40.8	82.5	27,824	21	Omaha, Neb.	1,040	41.2	96.	191,601	124
Marion, Ind.	810	40.5	85.7	23,747	19	Orange, N. J.	220	40.7	74.3	33,268	30
Marion, Ohio.	986	40.5	83.1	27,891	18	Oshkosh, Wis.	755	44.	88.5	33,162	33
Marshalltown,						Oswego, N. Y.	295	43.4	76.5	23,626	23
Iowa.	899	42.0	92.9	15,731	13	Ottumwa, Iowa.	653	41.	92.4	23,003	22
Mason, Iowa.	1,126	43.1	93.1	20,065	11	Owensboro, Ky.	393	57.9	87.1	17,424	16
Massillon, Ohio.	939	40.8	81.4	17,428	14	Paducah, Ky.	326	37.	88.6	24,735	23
Medford, Mass.	20	42.4	71.1	39,038	23	Parkersburg, W. Va.	615	39.3	81.6	20,050	18
Melrose, Mass.	59	42.4	71.1	18,204	16	Parsons, Kan.	902	37.4	95.3	16,028	12
Memphis, Tenn.	274	35.2	90.	162,351	131	Passaic, N. J.	60	40.8	74.1	63,841	55
Meriden, Conn.	150	40.6	86.2	34,764	32	Paterson, N. J.	180	40.9	74.2	135,875	126
Meriden, Miss.	344	32.2	88.5	23,399	23	Pawtucket, R. I.	100	41.8	71.3	64,248	52
Miami, Fla.	15	25.8	80.2	29,571	5	Peabody, Mass.	19	42.5	70.9	19,552	16
Michigan City, Ind.	597	41.7	86.9	19,457	19	Peekskill, N. Y.	11	41.3	73.9	15,868	15
Middletown, N. Y.	562	41.4	74.4	18,420	15	Pensacola, Fla.	39	30.3	87.1	31,035	23
Middletown, Ohio. ...	653	39.5	84.3	23,594	13	Peoria, Ill.	465	40.6	89.7	76,121	67
Milwaukee, Wis.	636	43.	87.9	457,147	374	Perth Amboy, N. J.	10	40.5	74.3	41,707	32
Minneapolis, Minn.	847	45.	93.1	380,582	301	Petersburg, Va.	83	37.2	77.5	31,012	24
Mishawaka, Ind.	743	41.7	86.2	15,195	12	Philadelphia, Pa. ...	68	39.9	75.1	1,823,779	1,549
Mobile, Ala.	15	30.6	88.	60,777	52	Phillipsburg, N. J.	218	40.7	75.2	16,923	14
Moline, Ill.	574	41.4	90.5	30,734	24	Phoenix, Ariz.	1,090	33.4	112.	29,053	11
Monessen, Pa.	762	40.1	79.9	18,179	12	Pierre, S. D.	1,490	44.3	100.4	3,209	4
Montclair, N. J.	241	40.8	74.2	28,810	22	Pine Bluff, Ark.	234	34.2	92.0	19,280	15
Montgomery, Ala.	160	32.4	86.3	43,464	38	Pittsburg, Kan.	932	37.4	94.7	18,052	15
Montpelier, Vt.	523	44.2	72.6	7,125	8	Pittsburgh, Pa.	758	40.5	80.	588,343	534
Mount Carmel, Pa. ...	1,056	40.8	76.4	17,469	18	Pittsfield, Mass.	1,000	42.4	73.2	41,763	32
Mt. Vernon, N. Y. ...	180	40.9	73.8	42,726	31	Pittston, Pa.	570	41.3	75.8	18,497	16
Muncie, Ind.	948	40.2	85.3	36,524	24	Plainfield, N. J.	107	40.6	74.4	27,700	21

CITIES OF THE UNITED STATES AND ITS POSSESSIONS, ETC. (Continued)

	ALT.	N.°	W.°	1920	19 0 (thous.)		ALT.	N.°	W.°	1920	1910 (thous.)
Plymouth, Pa.	535	41.2	76.0	16,500	17	South Bend, Ind. . .	712	41.8	85.2	70,983	54
Pontiac, Mich.	940	42.6	83.2	34,273	15	Spartanburg, S. C. .	878	34.8	82.	22,638	18
Port Arthur, Tex. . .	10	30.	94.	22,251	8	Spokane, Wash. . .	1889	47.6	117.6	104,437	104
Port Chester, N. Y. .	34	41.0	73.6	16,573	13	Springfield, Ill. . .	598	39.7	89.6	59,183	52
Port Huron, Mich. .	589	43.	82.5	25,944	19	Springfield, Mass. .	180	42.1	72.5	129,614	89
Portland, Me.	66	43.7	70.2	69,272	59	Springfield, Mo. . .	1300	37.1	93.1	39,631	35
Portland, Ore.	54	45.5	122.7	258,288	207	Springfield, Ohio. .	979	39.9	83.9	60,840	47
Portsmouth, Ohio. .	535	38.8	83.	33,011	23	Stamford, Conn. . .	40	41.	73.5	40,067	29
Portsmouth, Va. . .	10	36.8	76.4	54,387	33	Steubenville, Ohio. .	714	40.4	81.	28,508	22
Pottstown, Pa.	139	40.2	75.6	17,431	16	Stockton, Calif. . .	18	37.9	121.2	40,296	23
Pottsville, Pa.	900	40.6	76.2	21,876	20	Sunbury, Pa.	445	40.9	76.8	15,721	14
Poughkeepsie, N.Y. .	173	41.8	73.9	35,000	28	Superior, Wis.	650	46.7	92.1	39,671	40
Providence, R. I. . .	10	41.8	71.4	237,595	224	Syracuse, N. Y. . .	410	43.	76.1	171,717	137
Pueblo, Colo.	4695	38.2	104.6	43,050	42	Tacoma, Wash. . .	110	47.3	122.4	96,965	84
Quincy, Ill.	984	40.	91.3	35,978	37	Tallahassee, Fla. . .	215	30.3	84.3	5,637	5
Quincy, Mass.	100	42.2	71.	47,876	33	Tampa, Fla.	15	27.9	82.3	51,608	38
Racine, Wis.	626	42.7	87.9	58,593	38	Taunton, Mass. . .	.80	41.9	71.1	37,137	34
Raleigh, N. C.	362	35.8	78.8	24,418	19	Terre Haute, Ind. . .	485	39.4	87.3	66,083	58
Ranger, Tex.	1444	32.6	98.6	16,205	..	Toledo, Ohio.	603	41.6	83.5	243,164	168
Reading, Pa.	264	40.3	76.	107,784	96	Topeka, Kans.	928	39.	95.6	50,022	44
Reno, Nev.	4495	39.7	119.8	12,016	11	Torrington, Conn. .	600	41.8	73.1	20,623	15
Revere, Mass.	180	42.4	71.	28,823	18	Trenton, N. J.	60	40.2	74.9	119,289	97
Richmond, Calif. . .	10	37.9	122.4	16,843	7	Troy, N. Y.	200	42.7	74.7	72,013	77
Richmond, Ind.	939	39.9	84.9	26,765	22	Tucson, Ariz.	2375	32.2	111.	20,292	13
Richmond, Va.	164	37.5	77.5	171,667	128	Tulsa, Okla.	711	36.1	96.	72,075	18
Riverside, Calif. . .	848	3.40	117.4	19,341	15	Union, N. J.	104	40.6	74.3	20,651	21
Roanoke, Va.	925	37.3	80.	50,842	35	Uniontown, Pa. . .	980	39.9	79.8	15,692	13
Rochester, N. Y. . .	512	43.2	77.5	295,750	218	Utica, N. Y.	436	43.1	75.1	94,156	74
Rockford, Ill.	729	42.2	89.	65,651	45	Vallejo, Calif.	44	38.2	122.2	21,107	11
Rock Island, Ill. . .	581	41.4	90.6	35,177	24	Vicksburg, Miss. . .	201	32.3	90.9	18,072	21
Rome, N. Y.	460	43.2	78.6	26,341	20	Vincennes, Ind. . .	467	38.7	87.5	17,160	15
Sacramento, Calif. .	31	38.5	121.5	65,908	45	Waco, Tex.	396	31.4	97.2	38,500	26
Saginaw, Mich.	601	43.4	84.	61,903	51	Walla Walla, Wash. .	936	46.1	118.4	15,503	19
St. Cloud, Minn. . .	1043	45.6	94.1	15,873	11	Waltham, Mass. . .	80	42.4	71.2	30,915	28
St. Joseph, Mo.	874	39.7	94.9	77,939	77	Warren, Ohio.	880	41.2	80.9	27,050	11
St. Louis, Mo.	413	38.5	90.2	772,897	687	Washington, D. C. .	90	38.7	77.	437,571	331
St. Paul, Minn.	180	44.9	93.	234,698	215	Washington, Pa. . .	1156	40.2	80.2	21,480	19
Salem, Mass.	100	42.5	70.9	42,529	44	Waterbury, Conn. .	500	41.5	73.1	91,715	73
Salem, Ore.	171	44.9	123.	17,679	14	Waterloo, Iowa. . .	852	42.5	92.3	36,230	27
Salt Lake City, . .						Watertown, Mass. .	80	42.2	71.1	21,457	13
Utah.	4760	40.7	112.	118,110	93	Watertown, N. Y. .	478	44.	75.9	31,285	27
San Antonio, Tex. .	661	29.4	98.5	161,379	97	Watervliet, N. Y. .	49	42.7	73.7	16,073	15
San Bernardino, . .						Waukegan, Ill. . .	664	42.4	87.8	19,226	16
Calif.	1049	34.1	117.3	18,721	13	Wausau, Wis.	1167	45.0	89.6	18,661	17
San Diego, Calif. . .	300	32.7	117.1	74,683	40	Waycross, Ga. . .	138	31.2	82.4	18,068	14
Sandusky, Ohio. . .	598	41.3	82.7	22,897	20	Westfield, Mass. . .	149	42.1	72.8	18,604	16
San Francisco, Calif.	900	37.8	122.4	506,676	417	West Hoboken, N.J. .	10	40.7	74.	40,074	35
San José, Calif. . .	98	37.2	121.9	39,642	29	West New York, . .					
San Juan, P. R. . .	10	18.5	66.1	70,707	49	N. J.	10	40.7	74.	29,926	14
Santa Ana, Calif. . .	139	33.8	117.9	15,485	8	West Orange, N. J. .	100	40.8	74.2	15,573	11
Santa Barbara, . .						Wheeling, W. Va. . .	678	41.	80.9	56,208	42
Calif.	69	34.7	119.7	19,441	12	White Plains, N. Y. .	201	41.	73.8	21,031	16
Santa Fé, N. Mex. .	6850	35.6	106.	7,236	5	Wichita, Kans.	1295	37.7	97.2	72,217	52
Santa Monica, . .						Wichita Falls, Tex. .	951	33.7	98.4	40,079	8
Calif.	79	34.0	118.2	15,252	8	Wilkes-Barre, Pa. .	580	41.3	76.	73,833	67
Savannah, Ga.	20	32.1	81.1	83,252	65	Wilksburg, Pa. . .	922	40.4	79.8	24,403	19
Schenectady, N. Y. .	235	42.8	73.9	88,723	73	Williamsport, Pa. .	528	41.3	77.1	36,198	32
Scranton, Pa.	744	41.4	75.7	137,783	130	Wilmington, Del. . .	100	39.7	75.6	110,168	87
Seattle, Wash.	25	47.5	122.2	315,312	237	Winona, Minn.	666	44.0	91.6	19,143	19
Sedalia, Mo.	909	38.6	93.2	21,144	18	Winston-Salem, . .					
Selma, Ala.	127	32.4	87.0	15,589	14	N. C.	884	36.1	80.3	48,395	23
Shamokin, Pa.	900	40.7	76.6	21,204	20	Winthrop, Mass. . .	10	42.4	71.0	15,455	10
Sharon, Pa.	856	41.2	80.6	21,747	15	Woburn, Mass.	98	42.5	71.4	16,574	15
Shawnee, Okla. . .	1042	35.3	96.9	15,348	12	Woonsocket, R. I. .	140	42.2	71.5	43,496	38
Sheboygan, Wis. . .	589	43.7	87.7	30,955	26	Worcester, Mass. . .	600	42.2	71.3	179,754	146
Shenandoah, Pa. . .	1300	40.8	76.3	24,726	26	Yakima, Wash.	1065	46.7	120.5	18,539	14
Shreveport, La. . .	204	32.4	93.8	43,874	28	Yonkers, N. Y.	300	40.9	73.8	100,176	80
Sioux City, Iowa. .	1106	42.5	96.3	71,227	48	York, Pa.	371	39.9	76.7	47,512	45
Sioux Falls, S. Dak.	1398	43.5	96.9	25,202	14	Youngstown, Ohio. .	847	41.	80.8	132,358	79
Somerville, Mass. .	100	42.4	71.	93,091	77	Zanesville, Ohio. . .	726	39.9	82.	29,569	28

VII. CITIES OUTSIDE OF THE UNITED STATES HAVING A POPULATION OF 100,000 AND OVER, AND SOME OTHER CITIES OF IMPORTANCE.

Population figures, stated in nearest thousands, are from the latest available data, and are estimated where no census figures are obtainable.

Aachen....Germany...	146,000	Cadiz....Spain.....	63,000	Glasgow....Scotland...	1,034,000
Aberdeen....Scotland...	159,000	Cairo....Egypt.....	791,000	Gottenborg..Sweden....	202,000
Adelaide....Australia...	255,000	Calais....France.....	73,000	Gratz....Australia....	158,000
Adrianople..Greece....	50,000	Calcutta....India.....	1,263,000	Guadalajara.Mexico....	119,000
Agra....India.....	186,000	Cambridge..England....	59,000	Hague, The. Netherlands	353,000
Ahmabad..India.....	274,000	Campinas...Brazil.....	35,000	Halifaz....England....	99,000
Aleppo....Syria.....	250,000	Canton....China.....	950,000	Halifax....Canada....	70,000
Alexandria..Egypt.....	445,000	Cape Town..South Africa	207,000	Halle.....Germany....	182,000
Algiers....Algeria....	206,000	Cardiff....Wales.....	200,000	Hamborn...Germany....	110,000
Allahabad..India.....	156,000	Cassel....Germany....	162,000	Hamburg...Germany....	986,000
Altona....Germany....	169,000	Cartagena..Spain.....	103,000	Hamilton...Canada....	82,000
Amoy....China.....	400,000	Cawnpur....India.....	213,000	Hammer-	
Amritsar...India.....	160,000	Cettinje...Jugoslavia..	5,000	fest.....Norway....	3,000
Amsterdam..Netherlands	642,000	Changsha...China.....	550,000	Hangchow..China.....	730,000
Antwerp....Belgium....	334,000	Charlotten-		Hankow....China.....	1,500,000
Archangel...Russia....	43,000	burg....Germany....	323,000	Hanoi.....French In-	
Astrakhan..Russia....	164,000	Chemnitz...Germany....	304,000	do-China..	150,000
Asuncion...Paraguay....	100,000	Chinkiang..China.....	478,000	Hanover....Germany....	310,000
Athens....Greece....	301,000	Cholon....French In-		Havana....Cuba.....	364,000
Auckland...New Zealand	158,000	do-China..	227,000	Havre....France.....	163,000
Augsburg...Germany....	155,000	ChristchurchNew Zea-		Helsingfors..Finland....	189,000
Bagdad....Mesopotamia	230,000	land.....	103,000	Hiroshima..Japan.....	162,000
Bahia....Brazil.....	348,000	Christiania..Norway....	258,000	Hongkong...China.....	561,000
Baku....Azerbaijan....	250,000	Chungking..China.....	440,000	Howrah....India.....	158,000
Bangalore..India.....	238,000	Cologne....Germany....	633,000	Huddersfield England...	110,000
Bangkok...Siam.....	541,000	Colombo....Ceylon....	244,000	Hull.....England....	278,000
Barcelona...Spain.....	582,000	Constanti-		Hyderabad..India.....	404,000
Bareilly....India.....	128,000	nople....Turkey....	1,000,000	Irkutsk....Siberia....	129,000
Bari....Italy.....	109,000	Copenhagen.Denmark...	666,000	Jaffa....Palestine....	45,000
Barmen....Germany....	156,000	Cordoba....Argentina...	156,000	Jaipur....India.....	120,000
Basel....Switzerland..	136,000	Cork....Ireland....	77,000	Jerusalem..Palestine...	64,000
Bassora....Mesopotamia	85,000	Coventry...England....	128,000	Johannes-	
Batavia....Java.....	240,000	Crefeld....Germany....	124,000	burg....South Africa	284,000
Batum....Georgia....	46,000	Croydon....England....	191,000	Kabul....Afghanistan	150,000
Beirut....Syria.....	180,000	Dacca....India.....	117,000	Kanazawa..Japan.....	159,000
Belem....Brazil.....	275,000	Damascus...Syria.....	250,000	Karachi....India.....	216,000
Belfast....Ireland....	393,000	Danzig....Independ-		Karlsruhe..Germany....	136,000
Belgrade...Jugoslavia..	120,000	ent City..	330,000	Kazan....Russia.....	195,000
Benares....India.....	199,000	Delhi....India.....	303,000	Kharkof...Russia.....	258,000
Bergen....Norway....	91,000	Derby....England....	130,000	Kiel.....Germany....	205,000
Berlin....Germany....	1,903,000	Dortmund..Germany....	295,000	Kiev.....Russia.....	519,000
Berne....Switzerland..	105,000	Dresden....Germany....	529,000	Kioto....Japan.....	591,000
Birkenhead..England....	146,000	Dublin....Ireland....	403,000	Kishenef...Rumania....	114,000
Birmingham England...	919,000	Duisburg...Germany....	244,000	Kobe....Japan.....	609,000
Blackburn..England....	127,000	Dundee....Scotland...	168,000	Kokand....Siberia....	119,000
Bogota....Colombia....	144,000	Durazzo....Albania....	5,000	Konigsburg..Germany....	261,000
Bombay....India.....	1,173,000	Dusseldorf..Germany....	407,000	Krakow....Poland....	176,000
Bochum....Germany....	143,000	East Ham..England....	143,000	Lahore....India.....	280,000
Bologna....Italy.....	190,000	Edinburgh..Scotland...	420,000	La Paz....Bolivia....	107,000
Bolton....England....	179,000	Ekaterino-		La Plata...Argentina...	90,000
Bordeaux...France.....	267,000	slav....Russia.....	220,000	Leeds....England....	458,000
Bradford...England....	286,000	Elberfeld..Germany....	157,000	Leicester...England....	234,000
Bremen....Germany....	258,000	Erfurt....Germany....	130,000	Leipzig....Germany....	604,000
Breslau....Germany....	528,000	Erzerum....Armenia....	80,000	Leith....Scotland....	80,000
Brest....France.....	74,000	Essen....Germany....	439,000	Lemberg...Poland....	206,000
Brighton...England....	142,000	Fez....Morocco....	63,000	Leyton....England....	128,000
Brisbane....Australia...	210,000	Fiume....Independ-		Liege....Belgium....	165,000
Bristol....England....	377,000	ent City..	50,000	Lille.....France....	201,000
Bruges....Belgium....	54,000	Florence...Italy.....	242,000	Lima....Peru.....	176,000
Brunn....Czechoslo-		Flushing...Netherlands	23,000	Lisbon....Portugal....	490,000
vakia....	221,000	Frankfort..Germany....	433,000	Liverpool...England....	803,000
Brunswick..Germany....	140,000	Fuchow....China.....	650,000	Livourne...Italy.....	108,000
Brusa....Turkey.....	110,000	Gateshead..England....	125,000	Lodz.....Poland....	452,000
Brussels...Belgium....	685,000	Gelsen-		London	
Budapest...Hungary....	1,185,000	kirchen...Germany....	169,000	(boroughs)England....	4,483,000
Buenos AiresArgentina...	1,674,000	Geneva....Switzerland..	135,000	London	
Bukharest...Rumania....	309,000	Genoa....Italy.....	300,000	(greater)..England....	7,476,000
Burnley....England....	103,000	Ghent....Belgium....	166,000	Lucknow...India.....	244,000

FOREIGN CITIES HAVING A POPULATION OF 100,000 AND OVER, ETC. (Continued)

Lyon.....France.....	562,000	Pilsen.....Czechoslovakia.....	88,000	Southampton.....England.....	160,000
Madras.....India.....	523,000	Ping Yang.....Chosen (Korea).....	59,000	South Shields.....England.....	117,000
Madrid.....Spain.....	609,000	Piræus.....Greece.....	133,000	Spalatro.....Austria.....	21,000
Madura.....India.....	139,000	Pisa.....Italy.....	67,000	Srinagar.....India.....	142,000
Magdeburg.....Germany.....	286,000	Plauen.....Germany.....	105,000	Stettin.....Germany.....	233,000
Mainz.....Germany.....	108,000	Plymouth.....England.....	210,000	Stockholm.....Sweden.....	419,000
Malaga.....Spain.....	136,000	Poona.....India.....	177,000	Stockport.....England.....	123,000
Manchester.....England.....	731,000	Port-au-Prince.....Haiti.....	120,000	Stoke.....England.....	240,000
Mandalay.....Burma.....	147,000	Porto Alegre.....Brazil.....	150,000	Strasburg.....France.....	167,000
Manila.....Philippine Islands.....	283,000	Port Said.....Egypt.....	91,000	Stuttgart.....Germany.....	309,000
Mannheim.....Germany.....	230,000	Portsmouth.....England.....	247,000	Suchau.....China.....	550,000
Marakesh.....Morocco.....	102,000	Posen.....Poland.....	157,000	Sucre.....Bolivia.....	30,000
Marseille.....France.....	586,000	Prague.....Czechoslovakia.....	676,000	Suez.....Egypt.....	31,000
Meshed.....Persia.....	80,000	Preston.....England.....	117,000	Sunderland.....England.....	159,000
Mekka.....El Hejaz.....	70,000	Quebec.....Canada.....	79,000	Surabaya.....Java.....	161,000
Melbourne.....Australia.....	784,000	Rangoon.....Burma.....	340,000	Surat.....India.....	118,000
Messina.....Italy.....	150,000	Reval.....Esthonia.....	160,000	Swansea.....Wales.....	158,000
Mexico City.....Mexico.....	1,080,000	Reykjavik.....Iceland.....	7,000	Sydney.....Australia.....	857,000
Middlesbrough.....England.....	131,000	Rheims.....France.....	77,000	Szegedin.....Hungary.....	110,000
Milan.....Italy.....	663,000	Rhondda.....Wales.....	163,000	Tabriz.....Persia.....	200,000
Montevideo.....Uruguay.....	362,000	Riga.....Latvia.....	185,000	Tashkent.....Siberia.....	272,000
Montreal.....Canada.....	607,000	Rio de Janeiro (Federal Dist.).....Brazil.....	1,158,000	Teheran.....Persia.....	220,000
Moscow.....Russia.....	1,050,000	Rome.....Italy.....	591,000	Tientsin.....China.....	839,000
Mosel.....Mesopotamia.....	90,000	Rosario.....Argentina.....	223,000	Tiflis.....Georgia.....	328,000
Mukden.....Manchuria.....	158,000	Rostov.....Russia.....	124,000	Tokio.....Japan.....	2,173,000
Mulheim.....Germany.....	127,000	Rotterdam.....Netherlands.....	511,000	Tomsok.....Siberia.....	117,000
Munich.....Germany.....	631,000	Roubaix.....France.....	113,000	Toronto.....Canada.....	377,000
Murcia.....Spain.....	124,000	Rouen.....France.....	124,000	Tottenham.....England.....	147,000
Nagasaki.....Japan.....	177,000	Saarbrücken.....Germany.....	105,000	Toulon.....France.....	106,000
Nagoya.....Japan.....	430,000	Saigon.....French-Indo-China.....	72,000	Toulouse.....France.....	175,000
Nagpur.....India.....	150,000	Saint Etienne.....France.....	168,000	Trebizond.....Turkey.....	55,000
Nancy.....France.....	113,000	St. John.....Canada.....	47,000	Trichinapoli.....India.....	120,000
Nanking.....China.....	390,000	St. John's.....Newfoundland.....	34,000	Tripoli.....Libia.....	73,000
Nantes.....France.....	184,000	Salford.....England.....	234,000	Tucuman.....Argentina.....	91,000
Naples.....Italy.....	698,000	Saloniki.....Greece.....	170,000	Tula.....Russia.....	141,000
Neukölln.....Germany.....	262,000	Salvador.....Brazil.....	348,000	Tunis.....Tunis.....	170,000
Newcastle.....England.....	275,000	Samara.....Russia.....	144,000	Turin.....Italy.....	452,000
Nice.....France.....	156,000	Samarang.....Java.....	107,000	Utrecht.....Netherlands.....	140,000
Ningpo.....China.....	700,000	Samarkand.....Siberia.....	98,000	Valencia.....Spain.....	236,000
Nish.....Jugoslavia.....	25,000	Santiago.....Chile.....	507,000	Valparaiso.....Chile.....	182,000
Nizhni Novgorod.....Russia.....	112,000	Sao Paulo.....Brazil.....	504,000	Vancouver.....Canada.....	100,000
Norwich.....England.....	121,000	Saratov.....Russia.....	235,000	Varna.....Bulgaria.....	51,000
Nottingham.....England.....	263,000	Scutari.....Albania.....	32,000	Venice.....Italy.....	168,000
Nuremberg.....Germany.....	353,000	Semipalatinsk.....Siberia.....	32,000	Verdun.....France.....	22,000
Odessa.....Russia.....	631,000	Seoul.....Chosen (Korea).....	247,000	Versailles.....France.....	65,000
Oldham.....England.....	145,000	Seville.....Spain.....	151,000	Vienna.....Austria.....	1,841,000
Omsk.....Siberia.....	136,000	Shanghai.....China.....	1,100,000	Vilna.....Lithuania.....	205,000
Oporto.....Portugal.....	204,000	Shasi.....China.....	105,000	Vladivostok.....Siberia.....	91,000
Oran.....Algeria.....	141,000	Sheffield.....England.....	491,000	Walthamstow.....England.....	127,000
Osaka.....Japan.....	1,253,000	Singapore.....Straits Settlements.....	424,000	Warsaw.....Poland.....	931,000
Ostend.....Belgium.....	48,000	Smyrna.....Turkey.....	375,000	Wellington.....New Zealand.....	107,000
Ottawa.....Canada.....	107,000	Sofia.....Bulgaria.....	154,000	Wenchow.....China.....	225,000
Oxford.....England.....	57,000			West Ham.....England.....	301,000
Palermo.....Italy.....	346,000			Wiener-Neustadt.....Austria.....	35,000
Paris.....France.....	2,906,000			Wiesbaden.....Germany.....	98,000
Patna.....India.....	120,000			Willesden.....England.....	167,000
Peking.....China.....	1,300,000			Winnipeg.....Canada.....	178,000
Pernambuco.....Brazil.....	216,000			Yokohama.....Japan.....	423,000
Perth.....Australia.....	155,000			Zara.....Italy.....	33,000
Petrograd.....Russia.....	2,319,000			Zaragoza.....Spain.....	118,000
				Zurich.....Switzerland.....	207,000

INDEX

How to use this index: Much work has been put upon this index so that the users of this book may quickly get an understanding of a state, a commodity, an industry or any particular subject here treated. Persons using the index should remember that the book is based on geographic regions rather than upon political divisions. Under this plan a state is often described along with its neighbors. Thus the index for a state may refer to a page where the *name* of the state does not appear, but where the state or a part of the state is described as a part of a region. To get an understanding of the climate of a state it is often necessary to know about the movements of storms which are described fully in the part of the book dealing with other states.

Explanation of Symbols: Geographic and proper names are indexed in black-face type, (Aden), other subjects in light-face, (air). Map references are given by italic figures in parentheses, with or without location, as (307 Q3) or (307). The more important discussions of subjects are indicated by black-face figures, as 353. Other references are in light-face figures, as 356. Illustrations are shown by italic figures with asterisk, as *353. All references are to page numbers. **Abbreviations:** agr.—agriculture; App.—Appendix; mfg.—manufacturing.

Key to Pronunciation: âte, senâte, râre, cât, locâl, âsk, pârade; scêne, êvent, êdge, novêl, refêr; right, sln; cöld, ôbey, cöld, stöps, cômpare; ûnit, ûnite, bûrn, cût, focûs, menû; bôöt, fôöt; found; boil; functiön; chase; good; joy; then, thick; hw = wh as in when; zh = z as in azure; kh = ch as in loch.

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